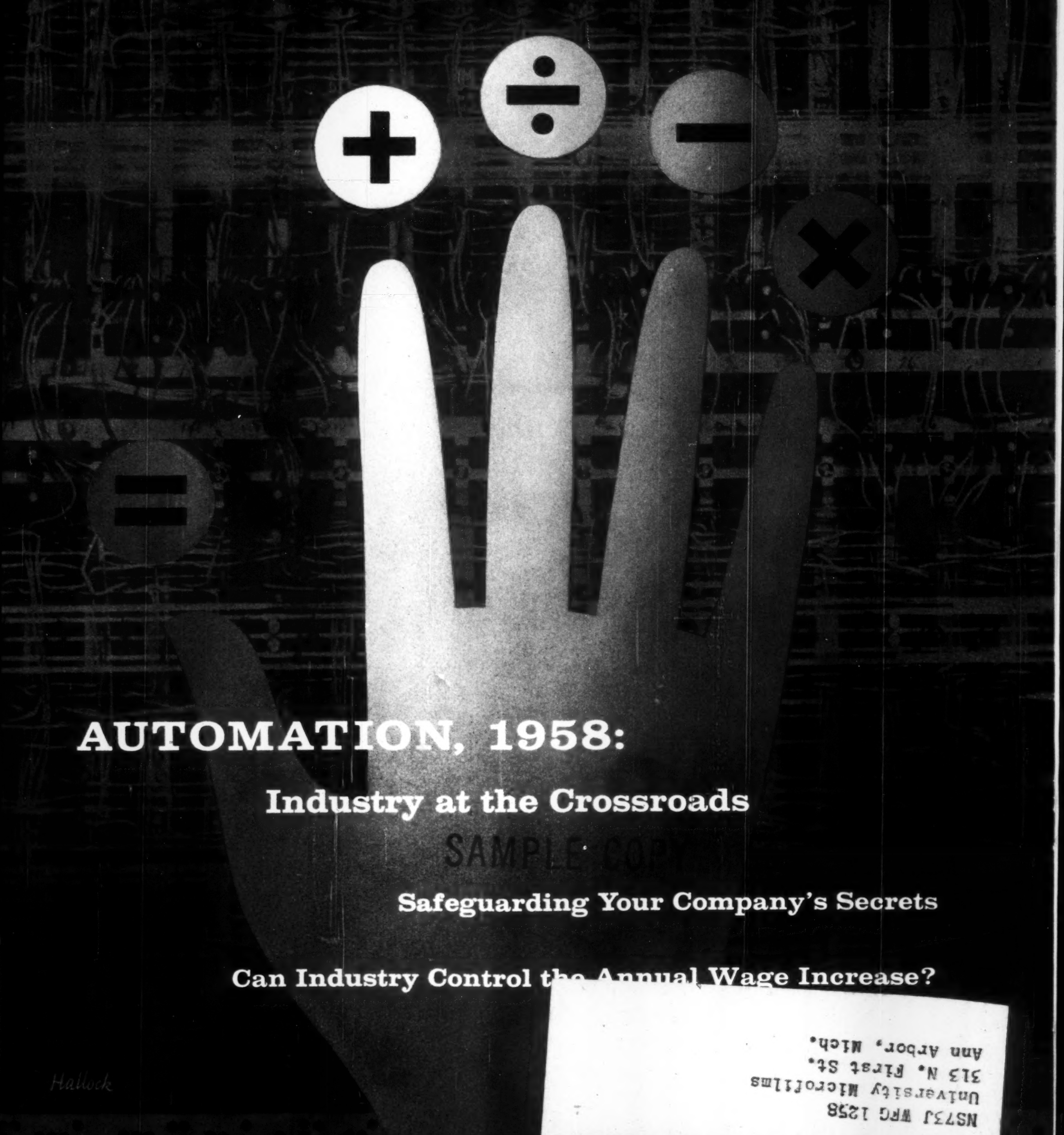
DUN'S REVIEW
and Modern Industry

A DUN & BRADSTREET PUBLICATION

August 1958 75¢



AUTOMATION, 1958:
Industry at the Crossroads

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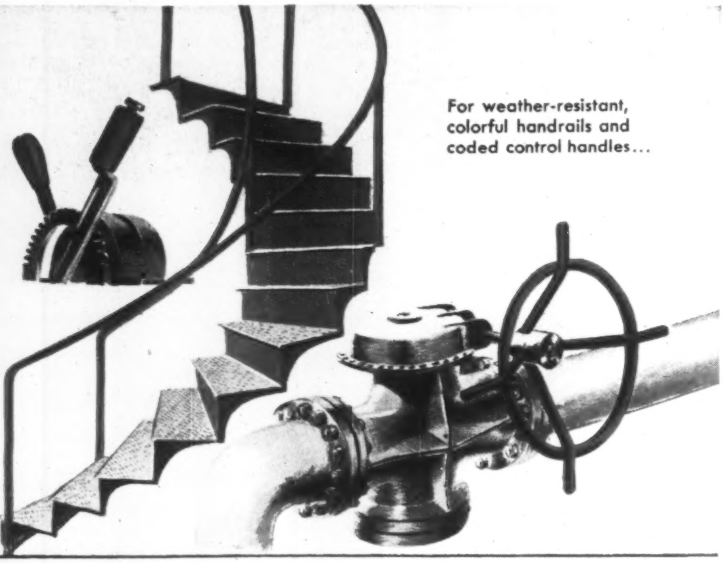

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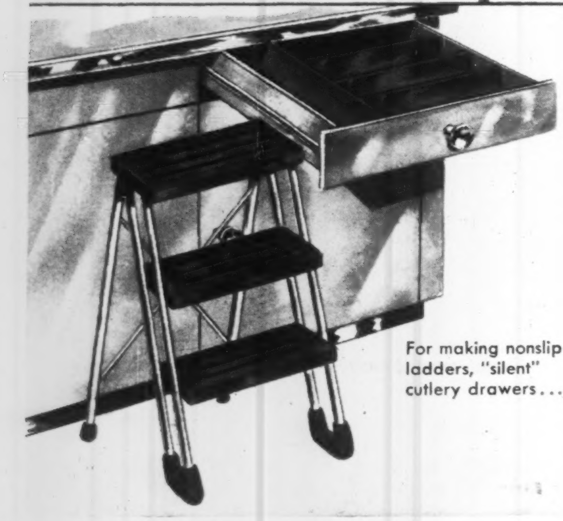

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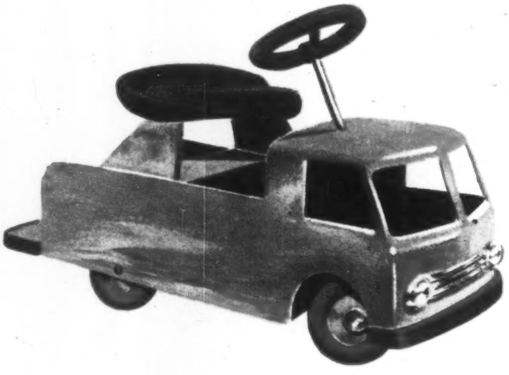

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DUN'S REVIEW
and Modern Industry

AUGUST
1958

Vol. 72 No. 2

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Bad planning and false expectations have proved disastrous for many companies. They could endanger the nation—unless management wakes up to the real challenge. John Diebold

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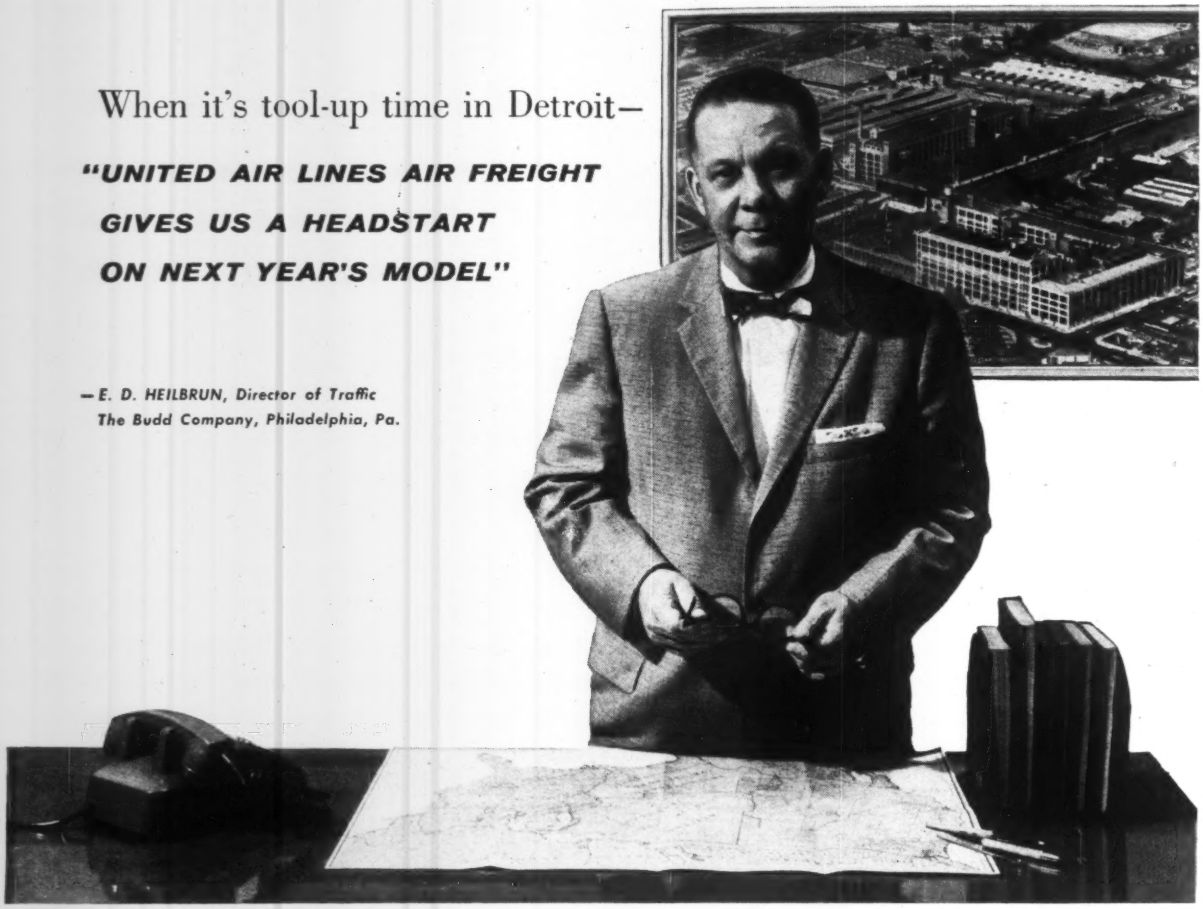
When it's tool-up time in Detroit—

"UNITED AIR LINES AIR FREIGHT GIVES US A HEADSTART ON NEXT YEAR'S MODEL"

—E. D. HEILBRUN, Director of Traffic
The Budd Company, Philadelphia, Pa.



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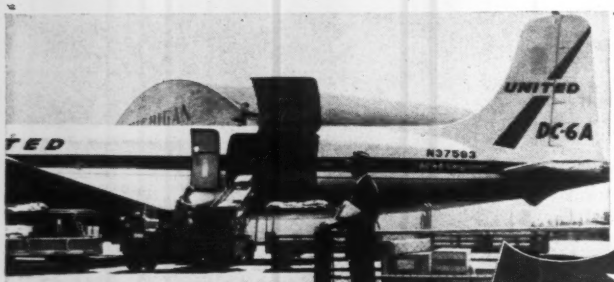

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DUN'S REVIEW AND MODERN INDUSTRY, August 1958, Vol. 72, No. 2. Published monthly by Dun & Bradstreet Publications Corp., J. Wilson Newman, President. Publication Office: 300 West Adams St., Chicago, Ill. Entered as second class matter at the Post Office, Chicago, Ill.

Correspondence for Editorial, Advertising, or Subscription Offices should be sent to Dun's Review and Modern Industry, 99 Church St., New York 8, N.Y.

Subscription: $5 a year in USA and Possessions, and Canada. Elsewhere, $10. Single copy, 75 cents. Please state title and employing company when subscribing.

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CREDITS: Cover, Robert Hallock; **page 19,** Devaney photograph; **page 39,** Magda Vasillov photograph; **page 40,** Wide World Photos, Inc., photograph; **page 42,** Myron Ehrenberg photograph from Chas. Pfizer & Co., Inc.; **page 53,** photograph from Pepsi-Cola International Panorama; **page 89,** Wide World Photos, Inc., photographs.

Editorial

Art, Craft, and Conscience

"ARTIFICER" IS A WORD whose first syllable suggests a heritage of creative talent. The word as a whole conveys something more than the skill of the craftsman, if something less than meaning of artist. Over the centuries, pride and skill have been the badges that identified true craftsmen. Builders of bridges, castles, and cathedrals converted the sketches of architects from two dimensions to three. Muscled smiths tempered steel to the strength and tension of Toledo blades. Cabinet makers shaped wood to compelling beauty in home and church. Printers and paper beaters made the word a thing of beauty to the eye as well as the ear. Potters, weavers, and gravers plied their trades with trained apprentices chosen for integrity as well as talent.

Men who belonged to the medieval guilds looked upon each assignment as an opportunity to excel. The treasures of metal, wood, stone, and glass are testimony of their loyalty to the high standards of their craft. If the hand skills of artificer and artisan have lost some of their luster in our day, the industrial revolution of the 19th century may be partly to blame. Yet, regardless of production schedules or union restrictions, carpenter, machinist, die maker, stone mason, and engraver still have plenty of opportunity to add art to craftsmanship. In factories where inflation and indifference have lowered the standards of many crafts, the individual can fight against the leveling influence of an acceptable average.

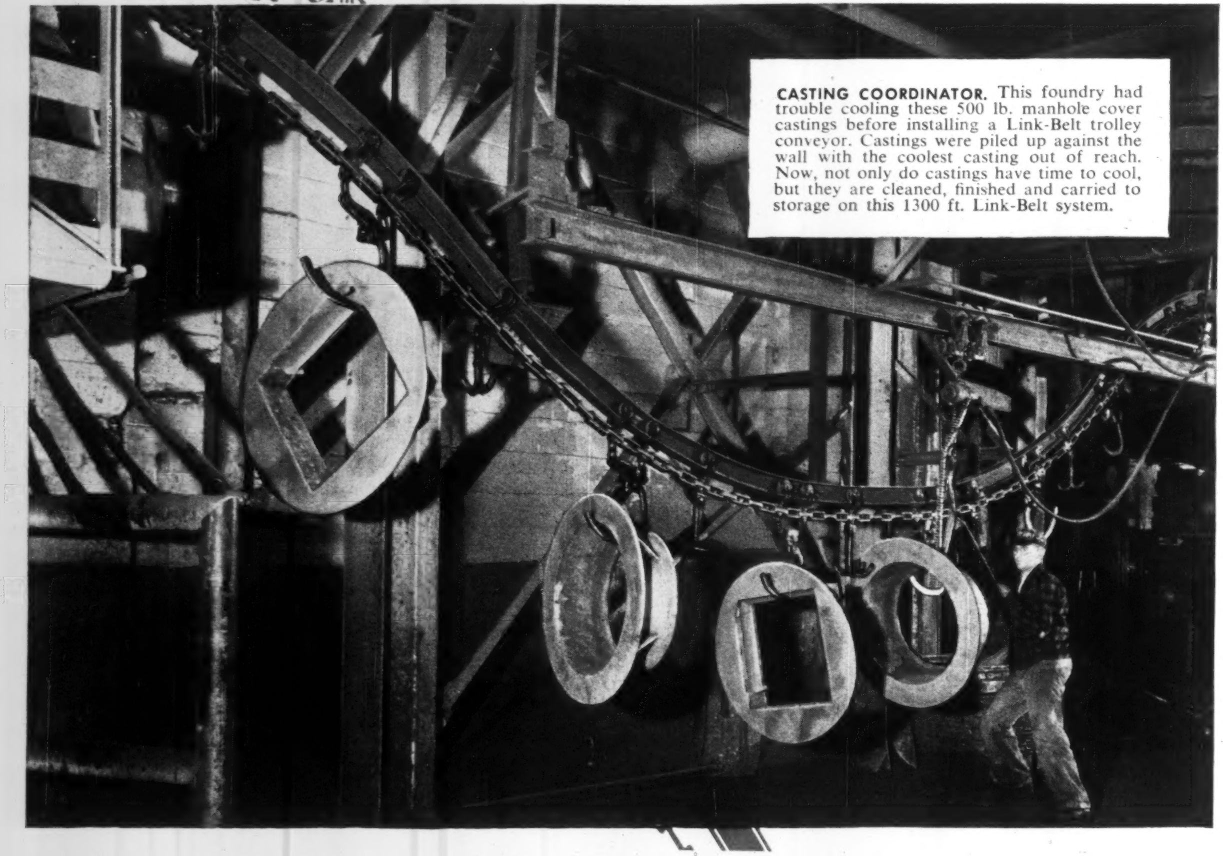
We cannot impugn the machine which has multiplied the comforts and luxuries of life and placed them within the reach of all. There is still room for conscientious effort at the lathe, press, drill, loom, and every other aid to mass production. The relative talent of the bulldozer operator is shown by his skilled eye in grading a slope. His touch at the control seems as sensitive as that of the jeweler installing a hair spring, or the seamstress threading a needle.

There is no product shaped by any sequence of power tooling that pride of craftsmanship can't improve. Even automation leaves room for skill in judgment. Quality control moves along with the same healthy rhythm as skill in craftsmanship. Despite temptations to meet competition or beat inflation by skimping on details, there is always an insistent market for quality.

It is well to recall that "manufacture" in its Latin origin means "hand-made." The machine may have opened the door to a vast consumer's market, but this is no justification for shoddy performance by either production manager or craftsman. "Quality" is still a word of importance on a warranty, and honesty is an intrinsic quality of the true artificer, whatever his product. For him, "good enough" is no good. It fails to pass the test of conscience.

The Editors

LINK-BELT trolley conveyors . . .



CASTING COORDINATOR. This foundry had trouble cooling these 500 lb. manhole cover castings before installing a Link-Belt trolley conveyor. Castings were piled up against the wall with the coolest casting out of reach. Now, not only do castings have time to cool, but they are cleaned, finished and carried to storage on this 1300 ft. Link-Belt system.

tie consecutive operations into continuous series

LET a Link-Belt trolley conveyor eliminate your handling bottlenecks by providing uninterrupted flow of materials along your production line. It will streamline your procedures . . . permit many diversified operations to be performed while material is being transported . . . reduce handling costs.

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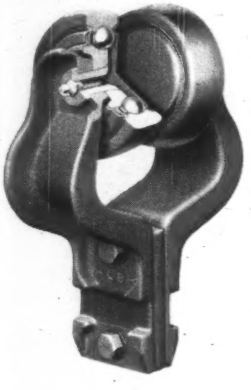


MADE IN A BEARING PLANT BY BEARING SPECIALISTS — Link-Belt precision ball-bearing trolleys are designed to maintain continuous rolling contact in all positions . . . create minimum power demand—another big reason why Link-Belt Trolley Conveyors are superior.

The Trend of Business **. . An action report on the U.S. economy**

The Economy Gathers Strength

EYING THE RECENT signs of stabilization and strength in the business picture, most business men are wondering whether improvement will persist through the Summer and lead into a real upswing by the end of the year.

Actually, although the chances are slim that there will be a vigorous upsurge in the Fall, it is now a safe bet that over-all business activity will move slowly and steadily upward. This will be the start of the recovery, but business will not match pre-recession peaks until well into 1959.

Increased consumer interest in some lines of durable goods will help boost retail trade, but volume will remain fractionally below a year ago. Although appreciable year-to-year declines will continue, manufacturers' orders will improve steadily, with some of the increase due to higher Government commitments. Manufacturers will continue to concentrate on reducing their inventories in the coming months, but they will be more cautious.

By late August, industrial production will move up from the low point of early Summer, and slight monthly increases will prevail through the end of the year and well into 1959. This will help raise the number of employed and lower the level of unemployment somewhat. As a result, higher wage and salary disbursements will boost personal income above the present high level.

Although corporate profits will move up moderately for the rest of the year, 1958 profit levels will remain appreciably below last year's. When a substantial rise in corporate profits does occur and consumer buying expands significantly, business men will begin thinking about spending for the expansion of facilities. Expenditures for new plants and equipment will continue downward well into 1959. The total output of goods and services will move up slightly in both the third and fourth quarters from the $424 billion of the second quarter.

In recent weeks shoppers showed a little more interest in household goods. Many business men see this as one of the brightest spots in the business scene. This trend will probably continue for the rest of the year, as consumers are heartened by more encouraging business news.

Not only will sales of small electrical housewares improve, but volume in big-ticket items, such as refrigerators, laundry equipment, and stoves will move up a bit. Extremely hot weather in many areas in July noticeably boosted sales of air conditioners and fans, and much of the ground that was lost in the May-June lag was recovered. But, though August sales will decline less than usual, turnover in cooling equipment this year will not match 1957.

Bright spots in retailing

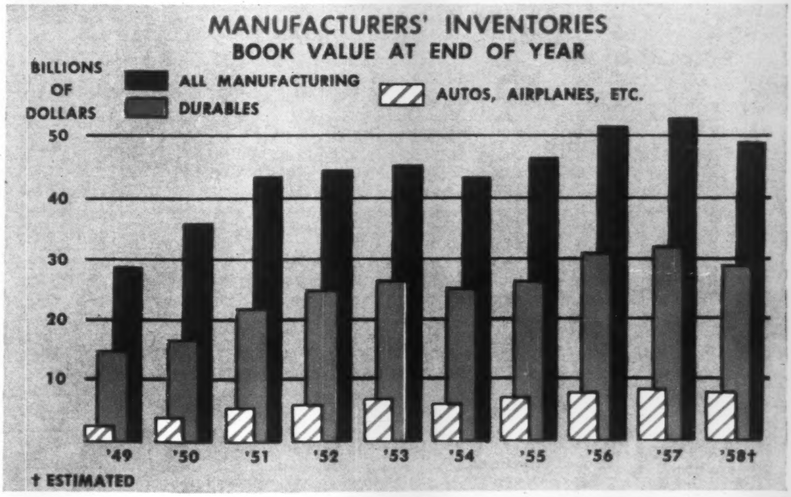
Retailers were disappointed in July sales of Summer outdoor furniture, but volume in upholstered merchandise, bedroom sets, and case goods showed signs of expanding. If this trend continues, over-all sales of furniture will match last year's levels at the end of August and into the Fall.

Although purchases of men's and women's Summer apparel picked up in July, storekeepers are looking to the Fall season and Christmas for the lift that will push total apparel sales for all of 1957 to another record level. The consumer will be prodded by sales promotions emphasizing new styles and lower prices.

Increased volume in picnic food specialties, fresh produce, some dairy products, and frozen foods helped food sales in July to advance steadily. It is probable that 1957 will be another record year for food stores.

Although there has been little change in retail food prices since late Spring, they will ease downward in the Fall as supplies of fresh meat, fruit, and vegetables reach the market. While prices of apparel and home furnishings edge lower in the next few months, consumers will continue to pay high prices for services and housing. When the recovery gains momentum some time next year, we can expect a resumption of over-all price increases, and more creeping inflation.

Perhaps recent improvements in the



LOWER STOCKS *of automobiles, airplanes, and other transportation equipment have accounted for a good part of the recent decline in total manufacturers' durables inventories.*

employment picture, as well as an easing in prices, have put the consumer in more of a buying mood. Following the peak level of June, when students entered the labor market in large numbers, the number of unemployed showed little change in July. It will drift downward in August and for the rest of 1958, as consumer buying and industrial output pick up. However, the level will remain appreciably lower than a year ago.

It is also likely that the average workweek of factory workers will inch up, as will their weekly earnings. In contrast, average hourly earnings will show little change unless consumers' prices start climbing again.

Personal income gains

The rise in personal income in the past few months has put a little more cash in the hands of the consumer. This trend will be sustained in the coming months as wage and salary disbursements improve and pay increases go into effect. Retailers hope that come Fall, shoppers will be more interested in spending and less keen on saving.

Steelmen were pleasantly surprised by the flow of new orders in July. That the decline from June was less than expected was partly attributed to the postponement of price hikes. Most steelmakers, however, will find it difficult to maintain healthy profit levels without increasing prices soon. The boost, which is likely to take place in August, is not expected to curtail significantly a substantial gain in orders from the automotive industry and moderate increases in buying by other users. Steelmen are banking on the fact that steel inven-

28 Compass Points of Business

	1. Employment—nonagricultural (in millions)	2. Unemployment (millions)	3. Consumers' Price Index 1947–49 = 100	4. Wholesale Price Index 1947–49 = 100	5. Industrial Stock Price Averages (in $)	6. Weekly Hours—Industrial Workers (Hours)	7. Weekly Earnings—Industrial Workers (in $)	8. Disposable Personal Income (billion $)	9. Disposable Income—Per Capita (1956 $)	10. Corporate Profit—After Taxes (billion $)	11. Industrial Production—Physical (Index)	12. Building Permits—120 Cities (million $)	13. Plant and Equipment Expenditures (billion $)	14. Gross National Product (billion $)
'58 II	57.8	5.2	123.6	119.4	467.31	38.7	81.91	301.0●	1,639●	13.8	128*	1,554	31.1●	428.0●
'58 I	57.2	4.9	122.7	119.2	446.66	38.6	81.12	300.1●	1,645●	14.0	130*	1,144	32.4●	422.0●
'57 IV	59.1	3.0	121.5	118.1	439.02	39.3	82.80	301.4●	1,673●	18.3	139*	1,044	36.2●	433.0●
'57 III	59.4	2.7	121.0	118.2	491.50	39.9	82.73	302.9●	1,695●	20.4	144*	1,280	37.8●	439.0●
'57 II	58.7	2.9	119.7	117.2	497.00	39.8	82.06	299.3●	1,704●	20.5	143*	1,328	37.0●	434.3●
'57 I	58.3	2.8	118.6	116.9	475.17	40.2	82.34	295.5●	1,701●	21.5	146*	1,110	36.9●	429.1●
1957	58.9	2.9	120.2	117.6	475.67	39.8	82.48	298.8	1,693	20.6	143	4,722	37.3	440.3
1956	58.9	2.6	116.2	114.3	493.01	40.4	79.99	287.2	1,708	22.0	143	4,826	35.1	419.2
1955	56.5	2.7	114.5	110.7	442.70	40.7	76.52	270.2	1,660	21.5	139	4,571	28.7	397.5
1954	54.7	3.2	114.8	110.2	333.91	39.7	71.86	254.4	1,585	16.4	125	4,143	26.8	363.1
1953	55.4	1.6	114.4	110.1	275.96	40.5	71.69	250.2	1,592	16.7	134	4,034	28.3	365.4
1950	52.5	3.1	102.8	103.1	216.31	40.5	59.33	206.1	1,536	22.1	112	4,466	20.6	285.1
1949	50.7	3.4	101.8	99.2	179.48	39.2	54.92	188.2	1,439	15.8	97	3,131	19.3	258.1
1948	51.4	2.1	102.8	104.4	179.95	40.1	54.14	187.6	1,445	20.3	104	3,111	22.1	259.4
1939	35.6	9.5	59.4	50.1	142.66	37.7	23.86	70.4	1,053	5.0	58	1,029	5.5	91.1
1932	28.0	12.1	58.4	42.8	64.57	38.3	17.05	48.7	776	—3.4	31	336	2.6	58.5
1929	36.3	1.5	73.3	61.9	311.24	44.2	25.03	83.1	1,081	8.3	59	2,490	9.2	104.4

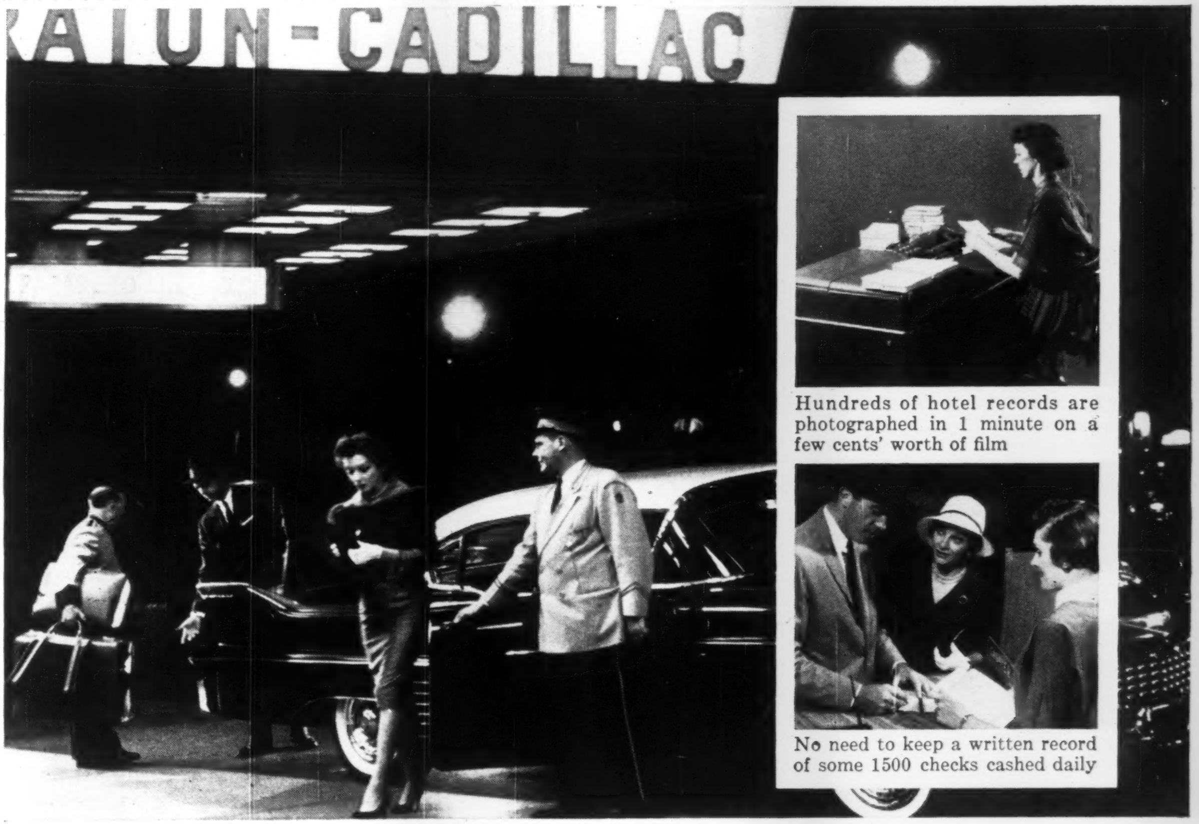
	15. Farm Receipts (billion $)	16. Exports (million $)	17. Imports (million $)	18. Retail Sales (million $)	19. Wholesale Sales (million $)	20. Manufacturing Sales (million $)	21. Total Business Inventories (million $)	22. Federal Receipts (billion $)	23. Federal Spending (billion $)	24. Gross Federal Debt (billion $)	25. Consumer Credit Outstanding (billion $)	26. Loans of Commercial Banks (billion $)	27. Deposits and Currency (billion $)	28. Interest on Business Loans (percentage)
'58 II	7.2	4,754	3,186	50,170	32,100	75,800	88,000	20.1	18.6	276.4	43.0	90.0	134.8	4.45
'58 I	7.1	4,370	3,166	44,626	31,500	76,133	89,208	20.6	17.3	272.6	42.6	93.0	132.0	4.49
'57 IV	10.0	4,954	3,332	53,935	32,800	83,149	89,260	13.0	18.1	274.9	44.8	93.9	138.6	4.85
'57 III	8.3	4,866	3,199	50,727	34,300	84,430	90,651	15.4	17.9	274.5	43.2	93.4	133.3	4.83
'57 II	6.3	5,414	3,205	50,761	33,900	86,404	90,383	21.2	18.1	270.6	42.2	93.3	133.4	4.40
'57 I	6.5	5,443	3,237	44,586	32,900	86,612	91,010	21.7	17.4	275.1	40.5	90.6	132.6	4.38
1957	31.1	19,286	12,698	199,820	135,200	340,846	89,260	72.2	71.6	274.9	44.8	93.9	138.2	5.00
1956	30.5	19,076	12,474	189,729	135,600	332,534	88,715	70.9	67.2	276.7	41.9	90.3	139.7	4.38
1955	29.5	15,510	11,390	183,851	127,200	316,087	80,412	63.4	66.1	280.8	38.6	82.6	138.2	3.93
1954	30.0	15,059	10,025	169,135	116,400	282,358	75,800	61.2	64.9	271.3	32.3	70.6	134.4	3.55
1953	31.4	15,698	10,875	169,094	117,600	294,175	77,444	63.8	73.0	266.1	31.2	67.6	130.6	3.69
1950	28.7	10,275	8,852	143,689†	100,800	231,415	62,333	37.3	37.7	257.4	21.4	52.2	117.7	2.70
1949	28.1	12,051	6,622	130,721	86,400	196,997	51,208	37.5	41.1	252.8	17.3	43.0	110.0	2.70
1948	30.5	12,653	7,124	130,521	95,172	211,560	55,072	40.9	35.6	252.3	14.4	42.5	111.6	2.50
1939	8.6	3,177	2,318	41,042	26,244†	61,340	19,876	5.0	8.9	40.4	7.2	17.2	36.2	2.10
1932	4.7	1,611	1,323	25,013	. . .	30,774	. . .	6.9	4.7	19.5	3.6	21.8	20.4	4.71
1929	11.3	5,241	4,399	48,459	37,814	70,262	24,097	3.9	3.1	16.9	6.4	35.7	26.4	5.83

●Annual rate seasonally adjusted *Quarterly figures seasonally adjusted
†Figures for this and prior dates are from another source and not strictly comparable with later data
Second quarter, 1958, figures for most series are based upon preliminary estimates and incomplete data.

Sources for the statistical data appear on page 15.

Short cuts with Recordak Microfilming

Latest report on how this low-cost photographic process is simplifying routines for more than 100 different types of business . . . thousands of concerns



Hundreds of hotel records are photographed in 1 minute on a few cents' worth of film

No need to keep a written record of some 1500 checks cashed daily

PICTURE-TAKING BUILDS GOODWILL, TRIMS RECORD-KEEPING COSTS

DETROIT, MICH.

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Pictures replace handwritten record

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Whatever your business, it will pay you to look into Recordak Microfilming. Chances are this easy, low-cost photographic method has brought surprising savings to companies just like yours. *No obligation whatsoever!*

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Steel production declined in July less than had been anticipated, and it will pick up substantially in late August and in the Fall. Total production in the third quarter will be close to that of the previous three months, and will reach its highest level for the year in the fourth quarter.

Dog days in Detroit

With a good number of factories shutting down to begin the model changeover process, automotive output declined sharply in July, and will remain at this low level until mid-August, when production of some 1959 models will get underway. Whether auto production will continue to rise for the rest of the year depends of course on how consumers take to the new models.

Dealers entered July with the lowest stockpile of passenger cars for that month since 1954. Sales in July continued at the slightly advanced rate of May and June, but remained considerably below last year. The lower rate of output and the steady sales tended to reduce stocks even further during July, and the trend is likely to continue this month.

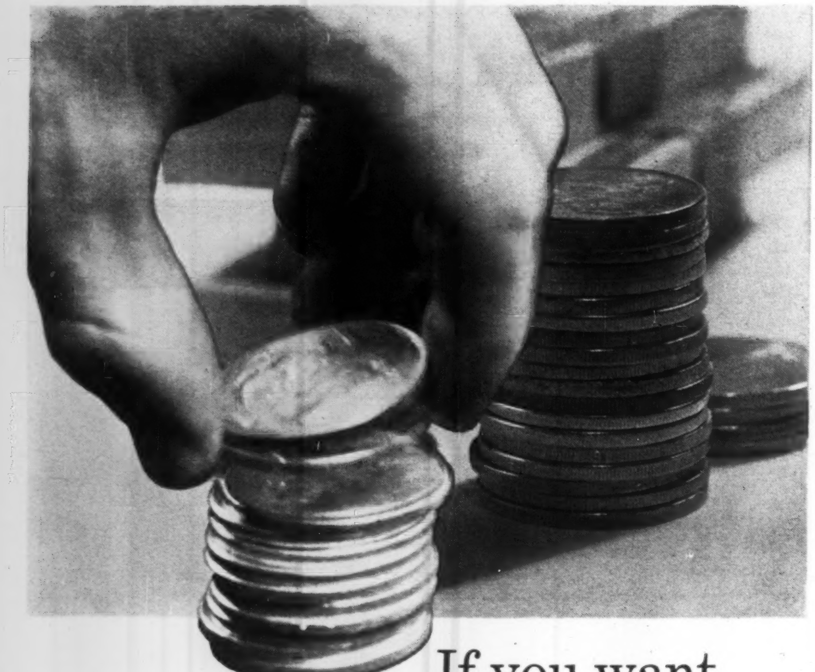
In July, there were further hints of a possible change in American taste in automobiles. In contrast to the general industry trend, sales of small foreign makes and American Motors' Rambler have been running comfortably ahead of 1957 levels. In addition, the Studebaker-Packard Corporation announced that it would begin production in August on a new small model and that the Packard would be discontinued.

Coal prospects brighten

Although the traditional miners' vacation period held coal output in July noticeably below the June level, the year-to-year declines have been narrowing. As the steel industry and other important coal consumers increase their production schedules and their fuel consumption during the Fall months, coal output will improve. The increase will be very gradual, and output for the year will remain noticeably below 1957.

Moderate production increases, not only in steel, automobiles, and coal, but also in oil, electric power, and manufacturing of both durables and nondurables, will help over-all industrial production rise slowly during the remainder of the third quarter and through the fourth quarter.

How long it will take industrial pro-



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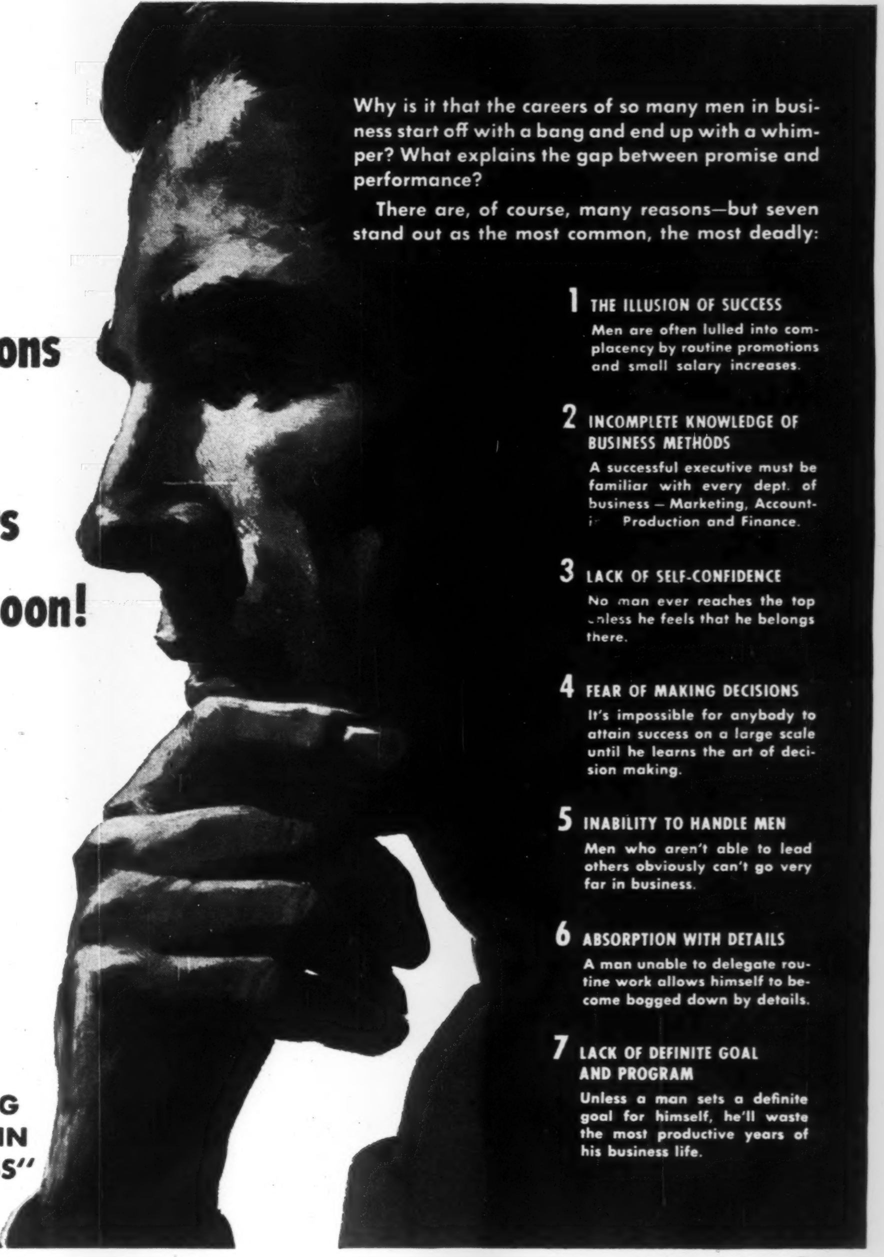
7 deadly reasons why so many business careers slow down so soon!



Why is it that the careers of so many men in business start off with a bang and end up with a whimper? What explains the gap between promise and performance?

There are, of course, many reasons—but seven stand out as the most common, the most deadly:

1 THE ILLUSION OF SUCCESS
Men are often lulled into complacency by routine promotions and small salary increases.

2 INCOMPLETE KNOWLEDGE OF BUSINESS METHODS
A successful executive must be familiar with every dept. of business – Marketing, Accounting, Production and Finance.

3 LACK OF SELF-CONFIDENCE
No man ever reaches the top unless he feels that he belongs there.

4 FEAR OF MAKING DECISIONS
It's impossible for anybody to attain success on a large scale until he learns the art of decision making.

5 INABILITY TO HANDLE MEN
Men who aren't able to lead others obviously can't go very far in business.

6 ABSORPTION WITH DETAILS
A man unable to delegate routine work allows himself to become bogged down by details.

7 LACK OF DEFINITE GOAL AND PROGRAM
Unless a man sets a definite goal for himself, he'll waste the most productive years of his business life.

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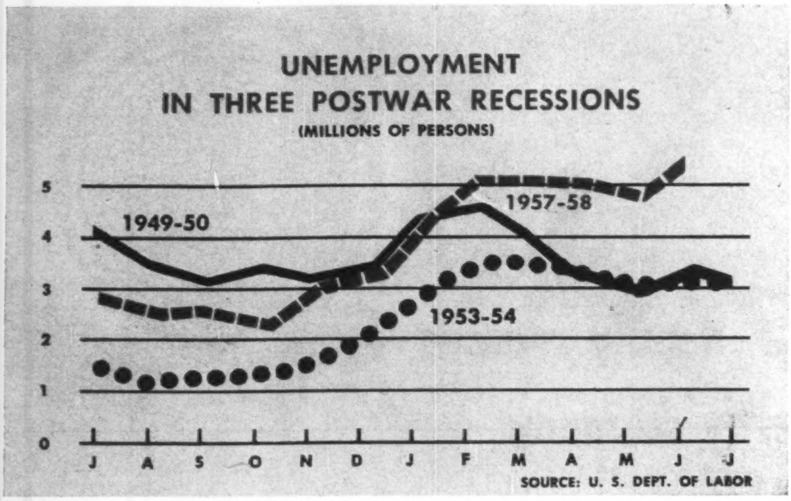

UNEMPLOYMENT *rose seasonally to 5.4 million in mid-June, as large numbers of students entered the labor market; the number of employed was at the highest level so far in 1958.*

duction to recover and reach the peak attained in December 1956 depends, of course, on the new orders and inventory situation among manufacturers. If the recent expansion in new orders for durable goods proves to be a lasting trend, manufacturers will be less tempted to reduce their inventories. Increased Government buying, as well as more ordering by private industry and trade, will spark a gradual but steady rise in manufacturers' orders for the rest of the year. Manufacturers will wait to size up the increase before deciding how much further inventories should be cut and when re-accumulation should begin.

The ratio of manufacturers' inventories to sales, although lower than it has been in recent months, is still high. The ratio will continue moderately downward during the fourth quarter. Recent reports show the most noticeable dips among durables in inventories of automobiles and other transportation equipment and primary metals. Stocks held by non-durables manufacturers showed little change.

Capital spending still sags

Doubts that sales will come up to previous expectations, and the belief that surplus capacity will continue for some time to come, have led business men to trim their planned outlays for new plants and equipment. Expenditures in the fourth quarter will be down moderately from the third quarter, and this trend will continue through the first half of 1959. When a turnabout does occur, it will be gradual.

This reduction in capital spending will continue to hold industrial construction

WEEKLY BUSINESS SIGNPOSTS

	Latest Week	Previous Week	Year Ago
STEEL INGOT PRODUCTION. . Ten thousand tons (a)	154	148	203
ELECTRIC POWER OUTPUT. . Ten million KW hours (b)	123	119	123
BITUMINOUS COAL MINED. . Hundred thousand tons (c)	77	13	101
AUTOMOBILE PRODUCTION. . Thousand cars and trucks (d)	103	83	139
DEPARTMENT STORE SALES. . Index 1947–1949 = 100 (e)	116	102	111
BANK CLEARINGS, 26 Cities. . Hundred million dollars (f)	23.3	23.7	21.6
BUSINESS FAILURES. . Number of failures (f)	279	275	266

SOURCES: (a) Amer. Iron & Steel Inst.; (b) Edison Elect. Inst.; (c) U.S. Bureau of Mines; (d) *Automotive News*; (e) U.S. Bureau of Labor Statistics; (f) DUN & BRADSTREET, INC. Steel data for the fourth week of July; sales for the second week; all others for the third week.

Mr. Schneider and "silent partner" dine at one of New York's most celebrated showplaces, The Tap Room of Keen's English Chop House.

For the record:

Ralph E. Schneider gives you his safe tips

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View above shows the smooth line construction of the aisle side of post and stringer. There are no protruding edges to create hazards. View at right shows the rigid connection when the stringer is "locked" to the post. Both views show the "L"-shaped tubing (no open seams—it is a one-piece continuous welded tube). Stringers raise and lower like a window.

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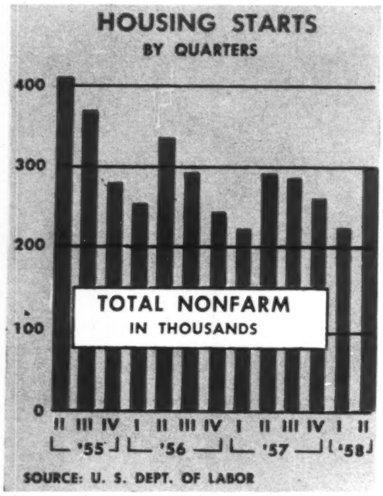


SOURCE: U. S. DEPT. OF LABOR

RECENT *Government action to relax down payment requirements helped boost home building during second quarter of this year.*

well below year earlier levels for the rest of 1958. Increases in commercial building, highway construction, and public and private housing will offset the decline in industrial building, and the total value of construction in 1958 will match or slightly exceed the record of 1957. Although some business men were encouraged by late reports that sales of construction equipment moved up after declining for a year, others regarded it as no more than a seasonal rise.

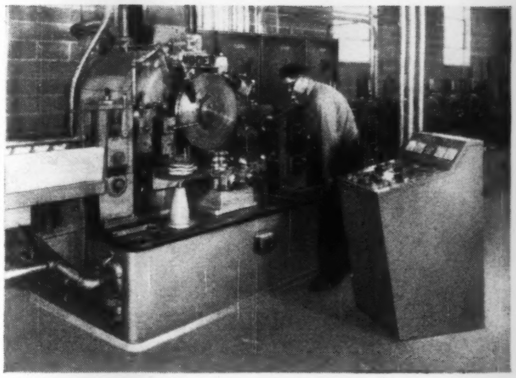
Housing: a mixed picture

In early Summer housing starts and applications for Federal Housing Administration mortgage insurance rose to the highest levels so far this year. However, housing starts for all of 1958 are not likely to be much higher than in 1957, when the level was the lowest since 1949. Despite the easier credit terms set up by the Government, recession fears and high construction costs will continue to dampen consumer interest in home building. Builders have been discouraged by the recent rise in vacancies. Some Government officials expect a lowering of the maximum interest rate on Government insured home loans if home building does not pick up substantially in the coming months.

The encouraging business news of mid-July helped push the stock average to new highs for the year. The average for the second week of July was at the highest level in nine months.

Total commercial and industrial loans at all Federal Reserve member banks were reduced during the first part of

The Yoder Company uses Cutler-Hammer Motor Control. Type M electric resistance weld tube mills automatically form cold rolled steel into pipe or tubing at a rate of 35 to 150 feet per minute. Cutler-Hammer Control is provided as standard equipment.



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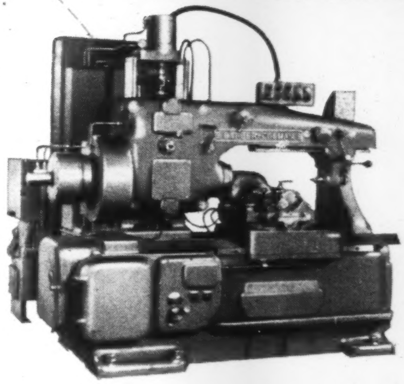
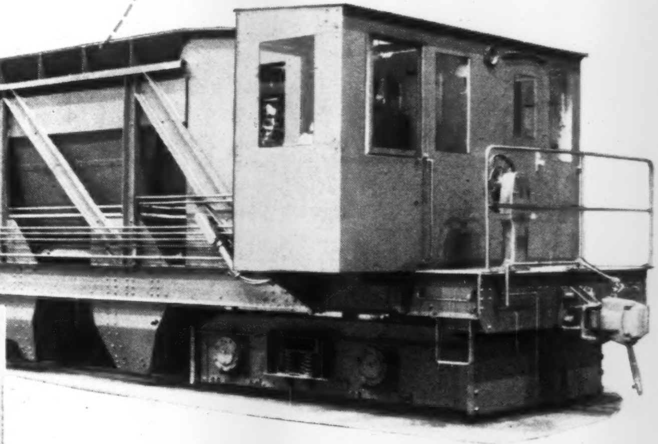
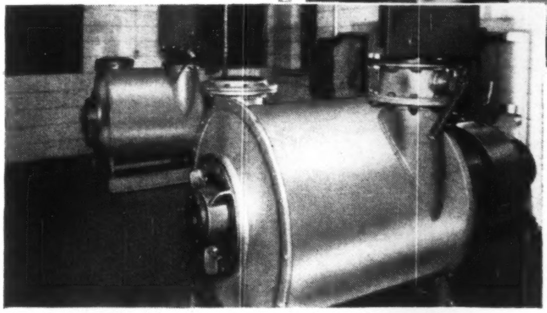


Barber-Colman Company uses Cutler-Hammer Motor Control. The 14-15 production hobbing machine uses Cutler-Hammer Relays as standard equipment.



The Atlas Car & Mfg. Company uses Cutler-Hammer Motor Control. 50 ton, double compartment, bottom dump ore transfer cars are equipped with Cutler-Hammer Control.



The Spencer Turbine Company uses Cutler-Hammer Motor Control. High volume centrifugal blowers provide the air supply for the aeration tanks at a new sewage plant. Cutler-Hammer Motor Control is supplied as standard equipment.

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July, and the total of such loans was moderately lower than a year ago. There was also a decline from earlier weeks in demand deposits adjusted and United States Government deposits, according to the Federal Reserve Board. The decline in loans of the past months has occurred despite the lower interest rates, but volume will increase when business activity begins to pick up.

SOURCES FOR COMPASS POINTS *page 6*

EMPLOYMENT: 1. NONAGRICULTURAL EMPLOYMENT; 2. UNEMPLOYMENT: *U.S. Bureau of the Census.*

PRICES: 3. CONSUMERS' PRICES; 4. WHOLESALE PRICES; *U.S. Bureau of Labor Statistics;* 5. INDUSTRIAL STOCK PRICE AVERAGES: *Dow Jones & Company.*

PRODUCTION: 6. WEEKLY HOURS; 7. WEEKLY EARNINGS OF INDUSTRIAL WORKERS: *U.S. Bureau of Labor Statistics;* 8, 9. DISPOSABLE INCOME; 10. CORPORATE PROFITS AFTER TAXES: *U.S. Office of Business Economics.* PRODUCTION: 11. INDUSTRIAL PRODUCTION (PHYSICAL): *Federal Reserve Board;* 12. BUILDING PERMITS, 120 CITIES: Dun & Bradstreet, Inc.; 13. PLANT AND EQUIPMENT EXPENDITURES: *U.S. Department of Commerce and Securities and Exchange Commission;* 14. GROSS NATIONAL PRODUCT: *U.S. Office of Business Economics.*

SALES: 15. FARM RECEIPTS: *U.S. Bureau of Agricultural Economics;* 16. EXPORTS; 17. IMPORTS: *U.S. Bureau of the Census;* 18. RETAIL SALES; 19. WHOLESALE SALES; 20. MANUFACTURING SALES: *U.S. Office of Business Economics.*

INVENTORIES: 21. TOTAL BUSINESS INVENTORIES: *U.S. Office of Business Economics.*

FEDERAL: 22. RECEIPTS; 23. EXPENDITURES; 24. GROSS NATIONAL DEBT: *U.S. Treasury Department.*

FINANCE: 25. CONSUMER CREDIT; 26. LOANS OF COMMERCIAL BANKS; 27. DEPOSITS AND CURRENCY; 28. COMMERCIAL LOAN RATES: *Federal Reserve Board.*

This report was prepared in the Business Economics Department, DUN & BRADSTREET, Inc., by John W. Riday.

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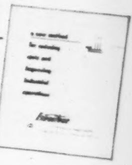

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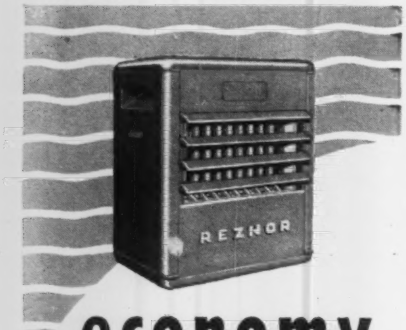

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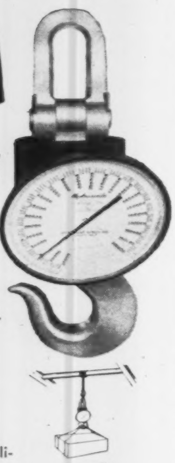

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Failures . . **Latest trends in business casualties**

Liabilities Up from May

ALTHOUGH the number of business failures in June dipped seasonally for the third month, their dollar liabilities rebounded from May's marked decline. A total of 1,260 concerns succumbed, involving liabilities of $61.4 million. Casualties were 16 per cent more numerous than in June a year ago, and their liabilities bulked 19 per cent larger. But improvement from 1957 was noted in some lines of business and regions.

The failure rate, adjusted for seasonal variation in DUN'S FAILURE INDEX, edged up to 57 per 10,000 listed businesses from 55 in May and 50 in June of last year. However, the current casualty rate was considerably below the 69 per 10,000 in 1939 and the 100 in 1933.

All of the increase in liabilities between May and June came from failures with liabilities of $100,000 or more. This group suffered the most noticeable rise from a year ago, 35 per cent.

Construction casualties fell in June to the lowest level in eleven months. In manufacturing, there were irregular month-to-month trends. Tolls declined in the heavy industries but increased in food, leather, textiles, paper, and printing. Retail casualties continued down during June in all lines except eating and drinking places.

While an uptrend from last year persisted generally, construction contractors suffered fewer casualties than in the previous June, and declines from 1957 occurred among lumber manufacturers and building materials wholesalers and retailers. On the other hand, about a third more manufacturers and wholesalers succumbed than last year. The over-all rise for retailing amounted to 16 per cent and for commercial services to 6 per cent.

Nearly all geographic regions reported dips in June failures, but six of the nine had more failures than a year ago. Totals in the East North Central and Middle Atlantic States rose most noticeably, with large cities reporting twice as sharp an increase as the balance of the country. On the other hand, declines from 1957 prevailed in the South Central and Pacific States.

FAILURES BY DIVISION OF INDUSTRY

	Cumulative Total (January–June)		Total liabilities in million $ (January–June)	
	1958	1957	1958	1957
MINING, MANUFACTURING	1442	1209	139.0	111.4
Mining—coal, oil, misc	47	33	6.9	6.1
Food and kindred products	103	94	7.8	6.4
Textile products, apparel	284	261	20.3	17.1
Lumber, lumber products	254	229	18.0	13.9
Paper, printing, publishing	96	68	5.4	4.0
Chemicals, allied products	33	27	1.5	2.3
Leather, leather products	65	36	8.9	4.3
Stone, clay, glass products	33	33	3.1	1.6
Iron, steel, and products	94	56	10.1	22.1
Machinery	153	133	15.8	14.0
Transportation equipment	39	32	13.4	3.0
Miscellaneous	241	207	28.0	16.7
WHOLESALE TRADE	772	660	38.5	43.1
Food and farm products	173	155	7.9	11.2
Apparel	42	26	2.0	2.0
Dry goods	28	16	0.9	0.6
Lumber, bldg. mats., hdwre	99	82R	6.7	5.1R
Chemicals and drugs	25	25R	0.5	1.2R
Motor vehicles, equipment	35	33R	1.0	1.4R
Miscellaneous	370	323	19.5	21.5
RETAIL TRADE	4124	3585	131.0	99.9
Food and liquor	582	602	13.0	12.2
General merchandise	157	153	6.5	6.9
Apparel and accessories	670	603	20.0	12.0
Furniture, furnishings	626	533	26.8	21.2
Lumber, bldg. mats., hdwre	256	242	8.5	7.2
Automotive group	589	421	24.5	10.9
Eating, drinking places	767	641	20.0	15.4
Drug stores	84	78	1.9	2.3
Miscellaneous	393	312	9.8	11.9
CONSTRUCTION	1132	1079	58.3	59.5
General bldg. contractors	456	422	32.4	33.3
Building subcontractors	613	587	21.5	20.0
Other contractors	63	70	4.4	6.2
COMMERCIAL SERVICE	601	556	36.2	22.6
TOTAL UNITED STATES	8071	7089	403.0	336.4

Liabilities are rounded to the nearest million; they do not necessarily add up to totals.

R Revised.

THE FAILURE RECORD

	June 1958	May 1958	June 1957	% Chg.†
DUN'S FAILURE INDEX*				
Unadjusted	56.7	58.1	49.5	+15
Adjusted, seasonally	57.3	55.3	50.0	+15
NUMBER OF FAILURES	1260	1341	1084	+16
NUMBER BY SIZE OF DEBT				
Under $5,000	147	152	169	−13
$5,000–$25,000	605	660	521	+16
$25,000–$100,000	378	423	298	+27
Over $100,000	130	106	96	+35
NUMBER BY INDUSTRY GROUPS				
Manufacturing	235	242	179	+31
Wholesale Trade	125	125	95	+32
Retail Trade	640	659	553	+16
Construction	161	207	164	− 2
Commercial Service	99	108	93	+ 6
LIABILITIES (*in thousands*)				
CURRENT	$61,445	$56,246	$51,454	+19
TOTAL	62,174	57,418	51,491	+21

*Apparent annual failures per 10,000 enterprises listed in the DUN & BRADSTREET *Reference Book*.

†Percentage change, June 1958 from June 1957.

In this record, a "failure" occurs when a concern is involved in a court proceeding or in a voluntary action likely to end in loss to creditors. "Current liabilities" here include obligations held by banks, officers, affiliated and supply companies, or the governments; they do not include long-term publicly held obligations.

This report was prepared in the Business Economics Department, DUN & BRADSTREET, INC., by Rowena Wyant.

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The sun never sets on Manpower, Inc., biggest venture of its kind the globe over, supplying temporary help to businesses of many kinds.

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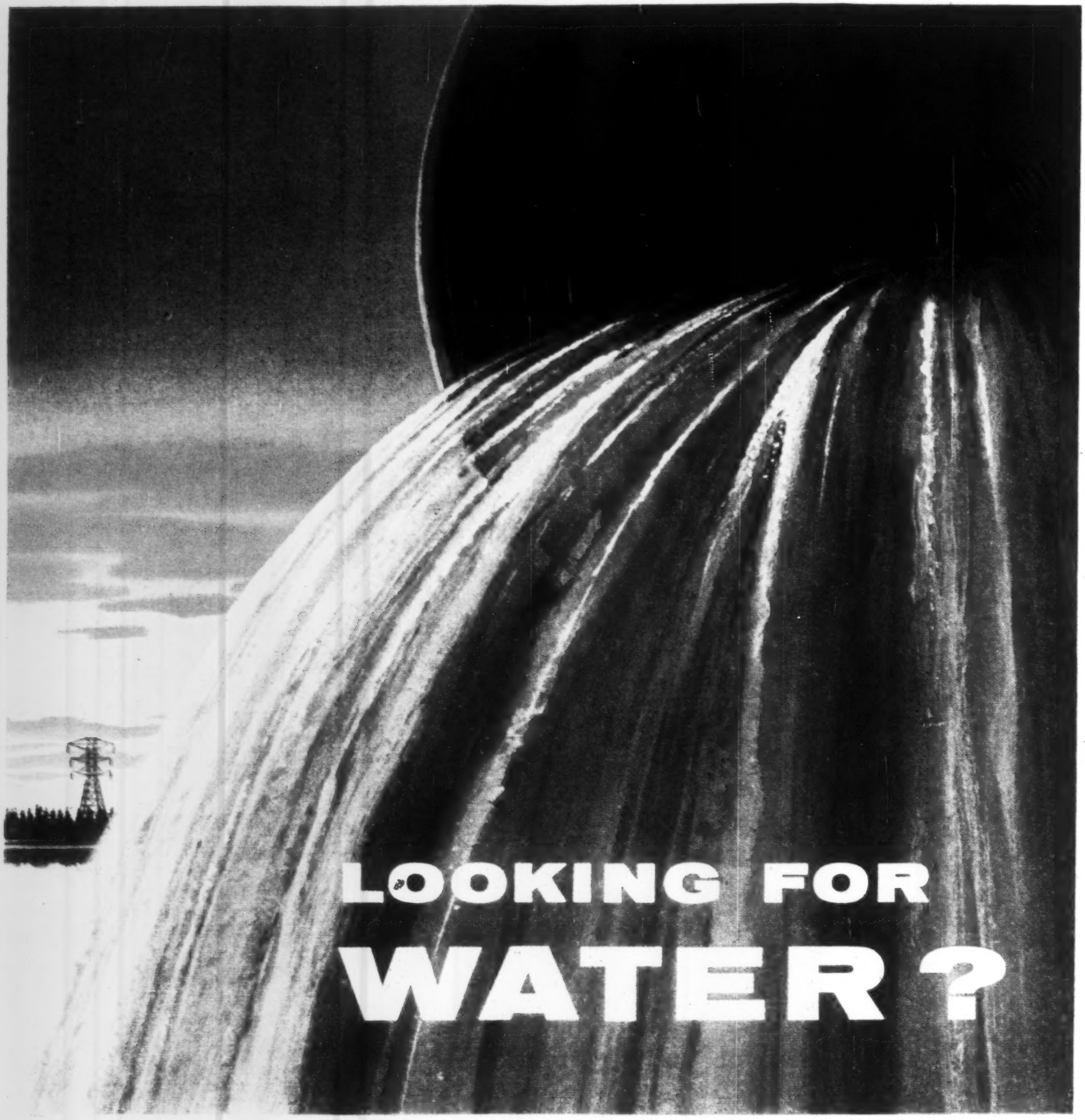

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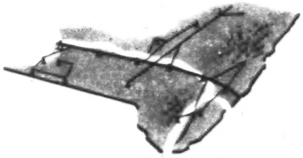

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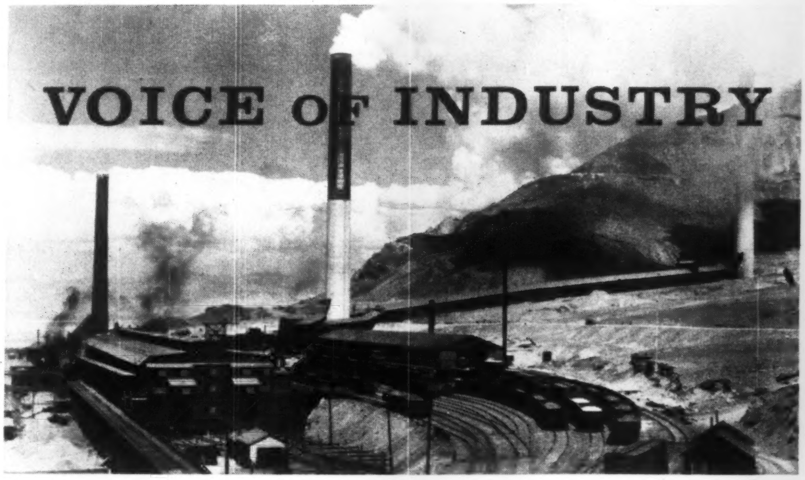

A Positive Cure for the Profit Pinch

ALSO: ***How to Organize Research; Technology Expands Your Sales Horizons; New Look in Appliance Distribution***

Prescription for Prosperity

CHARLES H. PERCY, *president, Bell & Howell Company, at the Economic Mobilization Conference of the American Management Association.*

The single biggest contribution any of us can make to the health of the nation today is the improvement of the business we're in.

That is why we at Bell & Howell have been taking major steps to strengthen our position in the market: by producing *better* values and doing it *fast*.

Last year, when the dip in general business activity became apparent, we undertook a two-fold program: (1) to *maintain* and in some instances *increase* those expenditures which create new sales and build for the future; (2) to further *reduce* and *eliminate* costs which add very little to the value of our product or future progress.

With the enthusiastic cooperation of our engineering group, our calendar of new-product schedules was moved ahead so that nine new products could be introduced this year instead of next year.

We also decided, as a sales stimulant, to reduce substantially the price of one of our fastest selling cameras. This meant selling more to reduce our manufacturing costs. And we would have to commit ourselves to manufacturing the additional cameras well ahead of time, to be ready for the increase in 1958 sales we hoped would result from stepped-up advertising, publicity, and the new low prices. This called for an expansion of our manufacturing facilities.

Our spending for capital equipment in 1958 will represent a 67 per cent increase over 1957.

To sell our additional product to dealers and the public, we increased our spending here, too: tripling our advertising and promotion expenditures in the second quarter of 1958.

In order to minimize the risks of our expanded manufacturing and sales activities, all divisions of the company joined in an intensive cost-reduction program.

Our accelerated program has resulted in a 21.5 per cent gain in sales, a 23 per cent gain in net earnings, and a 4.5 per cent gain in total employment in the first quarter of this year as against the first quarter of 1957.

What we have done, many other com-

BIG JOE makes **NEWS**

By far...the LOWEST PRICED machine of its kind on the market...

$299 COMPLETE

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- Complete bearing control throughout
- Synchronized 12-volt heavy-duty system
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- Lifting height 57", capacity 1,000 lbs.

Over 60 models from which to choose

Lifting heights to 160"; capacities to 3,000 lbs.

Write now for the complete master catalog number 659.

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MANUFACTURING COMPANY
Ralph Hines Road
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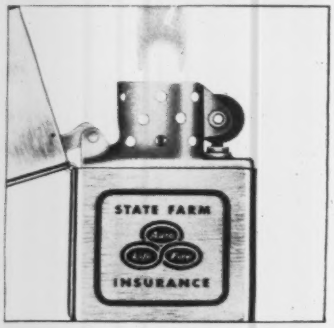
Business makes friends with Zippo lighters

The world's most dependable lighter promotes customer relations – spurs incentive programs – implements safety programs – and keeps company names in the public eye.



Zippo lighters have the most uncompromising guarantee in the annals of American business. Regardless of age or condition a Zippo is guaranteed to work as long as you have it or *we fix it free!*

Leading manufacturer of hand tools uses Zippos to maintain one of the best plant safety records in industry.

Blue-chip building products concern gets suggestion program off to good start by awarding Zippo lighters.

Leading maker of coin-operated music machines uses Zippo lighters to keep up sales enthusiasm.

Insurance company reminds prospects of services with never-failing Zippo lighters.

Gasoline station operator promotes customer loyalty with personalized Zippo lighters.

These are just a few examples of how Zippo lighters have helped businesses like your own. (Names will be sent upon request.)

Now the world's most dependable lighter in the new Slim-Lighter shape. Here is famous Zippo's new running mate, the new Zippo Slim-Lighter. It was especially designed for those who want a slender, lightweight lighter. The new Slim-Lighter has the same dependable Zippo action.

THANKS FOR A JOB WELL DONE
SAFETY AWARD

Facsimile signatures are now available on Zippo lighters. Zippo lighters can now be personalized with individual signatures along with company trade marks or any design you want. For complete information about this service, write to Dept. 188, Zippo Manufacturing Co., Bradford, Pa.

Zippo Manufacturing Co., Bradford, Pa., and Canada Ltd., Niagara Falls, Ontario

Zippo Manufacturing Company,
Dept. DR-188, Bradford, Pa.

Gentlemen: Please furnish me with complete information on Zippo lighters and your special design service.

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Firm ________________
Address ________________

panies can do and have done, each in its way. And this is a *very* good time to do it.

Making Research Pay Off

DR. VANNEVAR BUSH, *chairman of the board, Merck & Co., Inc., at the 10th Annual Rutgers University Business Conference.*

An industrial unit in a changing technological field must regard research as a necessity. But there is no faster way to get rid of money than by ill-planned or ill-conducted programs of research.

A research program should be a team effort, with the research staff an equal partner with the rest of the business. If research is put under production it will tend to become a fire department, rushing about to cure one production ill after another. A strong research group can be very embarrassing to production men who like to have all run smoothly and essentially unaltered, and it should be. If research is put under sales it will tend to produce monstrosities or trivialities, for salesmen have to sell currently and seldom take the long view. [But] if research is left entirely free, without coordination, it will probably produce a beautiful structure, admired by the elect, which will not pay.

New Markets in the Space Age

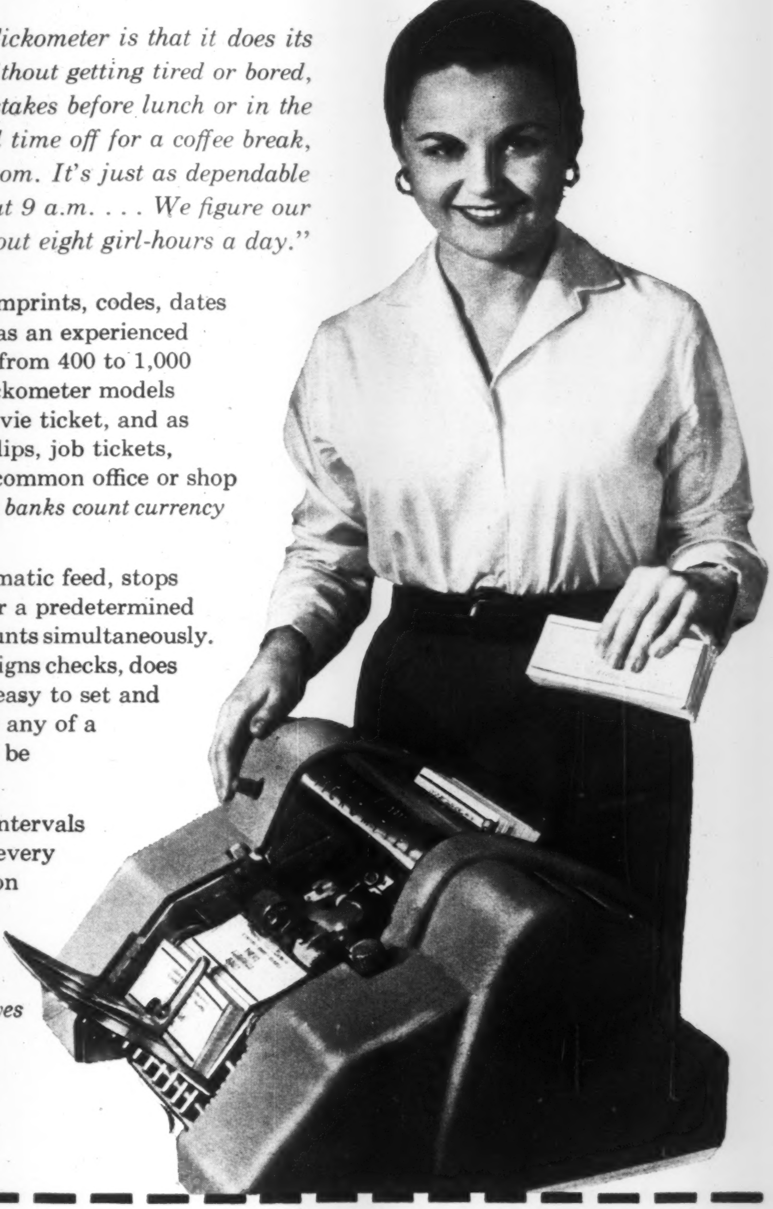
C. A. BASSETT, *general sales manager, The L. S. Starrett Company, before the Drop Forging Association.*

This age must rightly be termed "the Atomic and Space Age," for within a period of less than fifteen years, both have come into being. The Atomic Age has already shown a few of the changes we can expect in precision measuring. In many cases precision tools become an *expendable* product rather than a *durable* one. The tool

Still fresh
and efficient at 5 p.m.

"The wonderful thing about the Tickometer is that it does its counting and marking jobs without getting tired or bored, slowing down and making mistakes before lunch or in the late afternoon. It doesn't need time off for a coffee break, smoke, phone call, or the restroom. It's just as dependable and efficient at 5 p.m. as at 9 a.m. . . . We figure our Tickometer saves about eight girl-hours a day."

- The Tickometer counts, imprints, codes, dates or cancels eight times as fast as an experienced hand operator. Speeds range from 400 to 1,000 items per minute. Various Tickometer models handle items as small as a movie ticket, and as large as ledger sheets—sales slips, job tickets, coupons, checks, orders, any common office or shop form. *And it's so accurate that banks count currency with it.*
- The Tickometer has automatic feed, stops for faulty items; can be set for a predetermined count, registers sub or total counts simultaneously. With an optional accessory it signs checks, does consecutive numbering. It is easy to set and operate, can be easily used by any of a number of people. And it can be rented or bought.
- Even when used for only intervals or minutes, it can save hours every day; and give added production and convenience for many departments.
- *Ask the nearest Pitney-Bowes office for a demonstration. Or send coupon for free illustrated booklet and case studies.*



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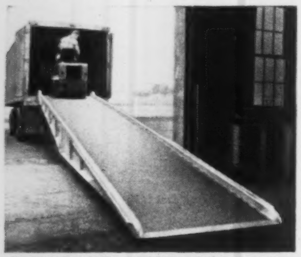
DOWN GO LOADING COSTS!

NARROW CONGESTED DOCK? This narrow rail dock required a flared Magliner dock board, allowing power trucks to make sharp, right angle turns.


GROUND LEVEL LOADING? Check into a Magliner mobile loading ramp—a loading dock on wheels . . . where you want it . . . when you want it. One man moves it.

PLANNING A NEW PLANT? Install Magliner Perma-Docks — the permanent magnesium dock board system. Low initial cost . . . economical installation . . . maintenance-free operation. Built-in dock loading efficiency—plus more usable dock space.

And they'll stay down with Magliner magnesium dock boards on the job! Magliners speed loading, eliminate dock congestion . . . get extra work from power trucks and other loading equipment. Costs go down and stay down because Magliners are magnesium light—easy to put down . . . easy to move. No heavy lifting . . . no injury hazards. Men, loads and equipment move *fast, sure, safe*—protected against accidents and costly damage.

Magliners are magnesium-strong too, for rugged dependable service . . . safely handle loads up to 20,000 lbs. and more Magliners are low in initial cost, provide long-life service, require less maintenance. Economy and cost savings right down the line!

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must be discarded after short periods of use, because of the build-up of radioactivity. This makes for business undreamed of even two years ago.

Now we have our first atomic power plant, and one can see the potential for thousands of these throughout the country. Next will be the atomic-powered, airplane already well on its way, and it is reasonable to assume that when this whole thing reaches the production stage, atomic-powered automobiles, trucks, tractors, and heating systems will add to our industrial potentials. True, this will partially replace already existing power facilities, but not so with the developments of "the Space Age."

The potentials for all manufacturers seem limitless in this field. We do not have to depend at all on the millions of war babies who will reach maturity in the mid-1960's for an increased manufacturing potential. Requirements for "the Atomic and Space Age" in the next 25 years could well outstrip our manufacturing facilities.

New Patterns in Appliance Selling

CHRIS J. WITTING, *vice president, Consumer Products Group, Westinghouse Electric Corp., before the Instalment Credit Conference.*

The appliance industry's distribution at both wholesale and retail levels is changing—fast. As profit margins are squeezed for distributors, manufacturers increasingly are being forced to set up factory branches and take on the role of the independent distributors.

In major markets, larger outlets are doing more and more of the business. In cities, large and small, manufacturers are aggressively trying to improve their dealer structure, seeking fewer but better outlets—substantial business men, willing to service and promote.

It's a tremendous market—98 per cent of all households have at least one major appliance; 35 per cent of them bought at least one major appliance in the eighteen months preceding a recent major Westinghouse survey; and 29 per cent plan to buy within a year.

And, it's a dynamic market, too.

HUDSON
Man O'War
KRAFT WRAP

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Man O'War

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Specify new HUDSON MAN O' WAR.

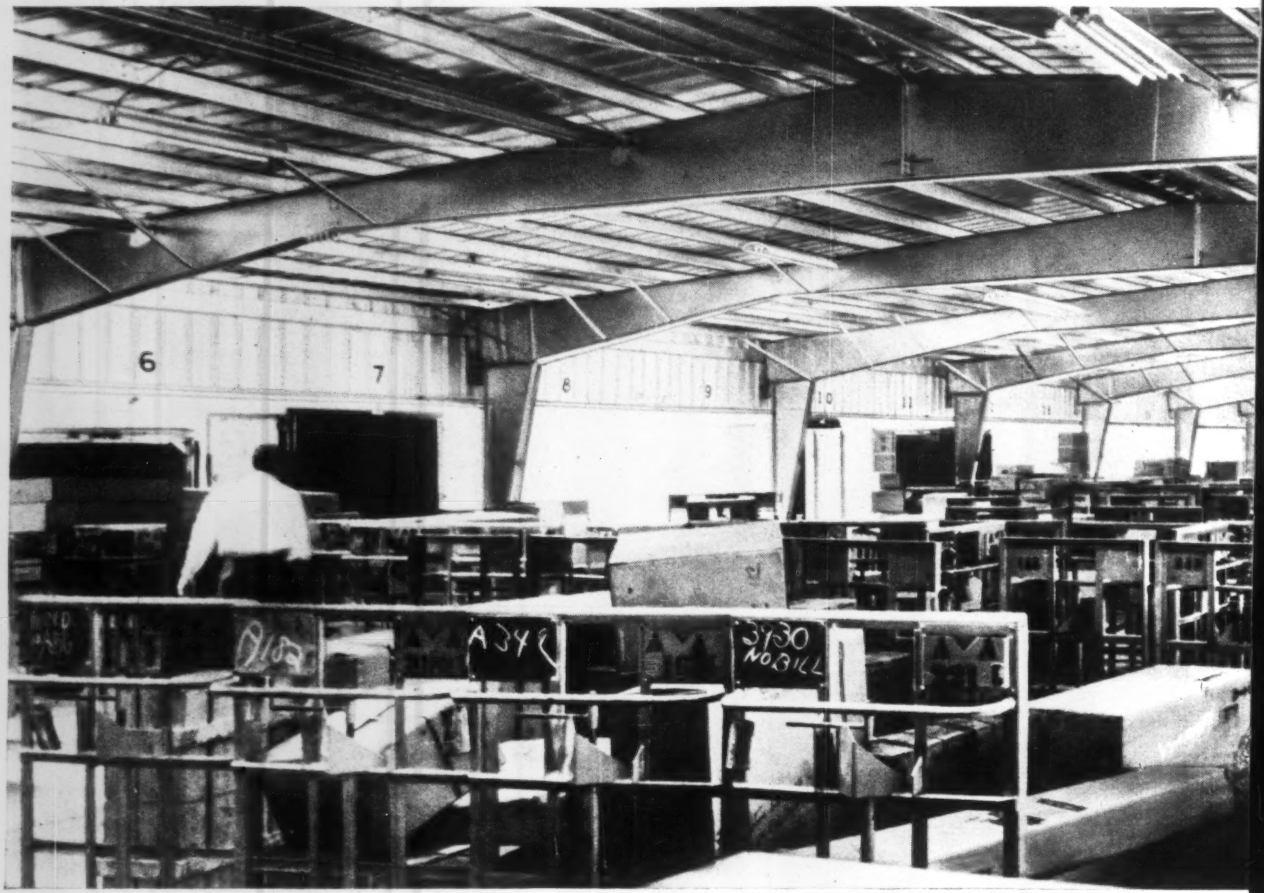
Though you may feel that all kraft looks alike—and, therefore, performs alike—there are many differences, potent reasons why Man O' War is a better buy: greater resistance to tearing and bursting . . . easier handling and folding . . . a smoother, brighter, more attractive finish.

And Hudson's integrated operation, from tree planting to the manufacture of finished products, assures dependable delivery, quality and performance order after order.

Unlike any other kraft . . .
Hudson's new Man O' War.

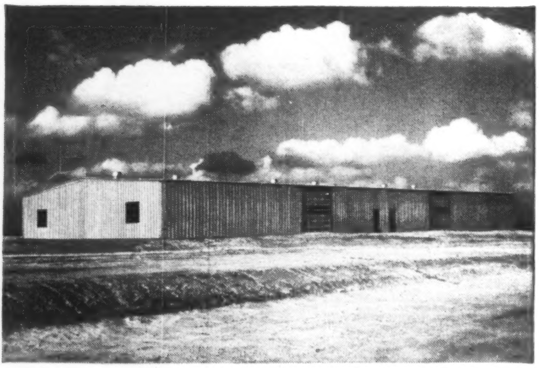
HUDSON Pulp & Paper Corp.
477 Madison Ave., New York 22, New York

WHY PAY FOR A FOREST



When you enjoy free movement of men, with clear-span, Low-

When a distinctive, prestige-type building is required, architectural styling can be achieved by combining Butler components with brick, block or any other building materials you choose.



When a dressed-up exterior is not necessary, Butler buildings can be covered economically with die-formed Butler metal panels that give lifetime protection—require little maintenance.

OF COLUMNS...

machines and materials for so little more Profile Butler buildings

Why invest precious capital in a cheap, low-cost building that may prove to be a costly place in which to operate your business?

With conventional post and beam construction costly floor space is taken up by columns. These columns also impose strict limitations on the way you can organize – use – the interior space.

But, in a clear-span, Low-Profile Butler building you can lay out production, traffic and storage areas with complete freedom. There isn't a single column from wall to wall – every foot of space is usable.

What about costs though? Low-Profile Butler buildings are a superior, more desirable type of construction. Consequently, they aren't cheap. But, they are such an economical way to build wide, clear-spans that they cost only a little more than the cheapest construction.

Mass-produced Butler components are available from stock. This saves routine engineering and custom fabrication. Pre-engineered to fit perfectly, they permit fast erection. You save weeks and months of costly planning and construction time.

For full details on clear-span, Low-Profile Butler buildings that give you more usable space and enable you to operate more efficiently—more profitably—contact your Butler Builder. He's listed in the Yellow Pages under "Buildings" or "Steel Buildings." Or write to us direct.

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Self-steering car of tomorrow traveling on super highway patrolled by radar towers. Future car may be powered by radical new engine, covered with new wonder metal, equipped with car-to-home phone, and controlled by automatic pilot.

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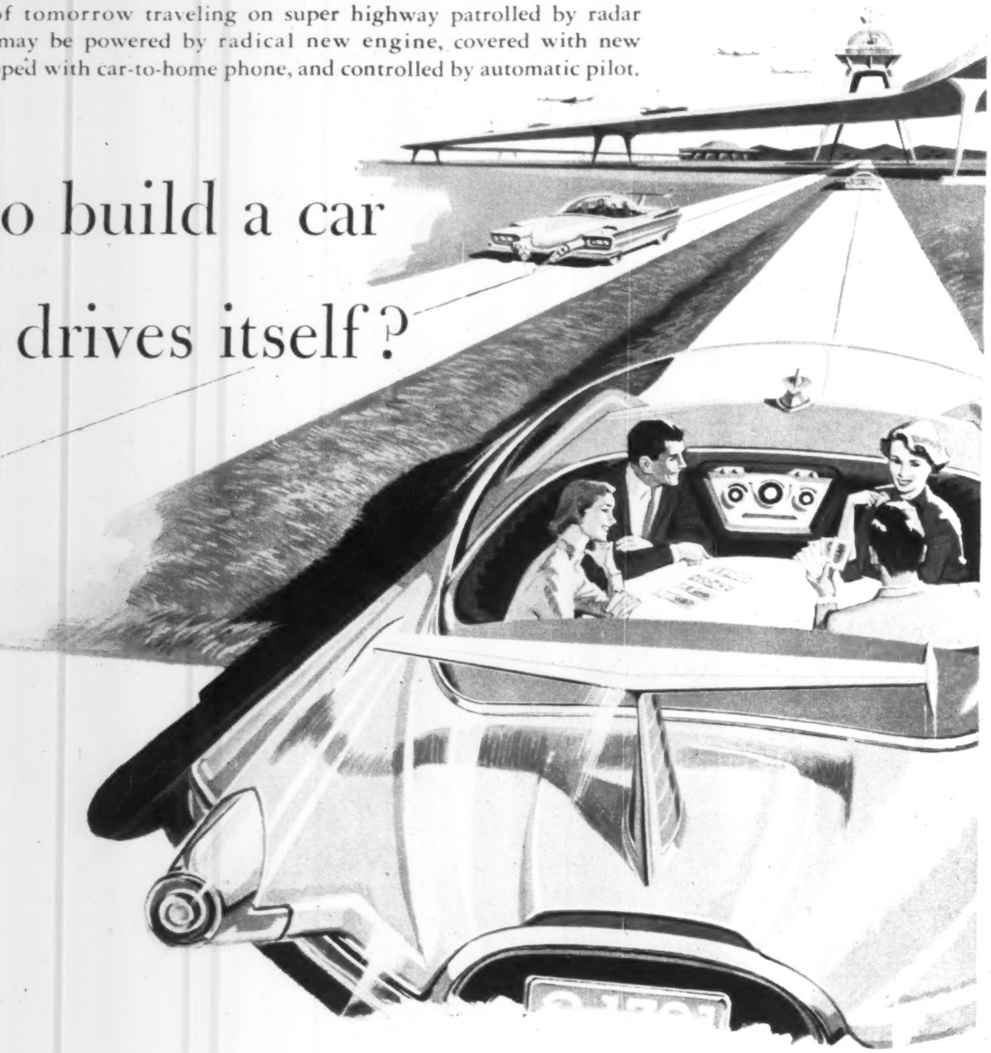

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SOME DAY—and it may come surprisingly soon—a car-maker will introduce a radically advanced new automobile, and cash in on the giant market of tomorrow. Thompson Products can help design and build important components for such a car *today*.

Right now Thompson can aid in creating self-steering devices, advanced new chassis and engines, uses for new wonder metals, and many other revolutionary features.

For years Thompson has been a leader in the development of steering systems . . . in improvement of automotive and aircraft engines, of chassis and airframes . . . and has pioneered in high-temperature, corrosion-resistant metallurgy.

No matter what kind of product you want to make, chances are Thompson can help you—thanks to its vast experience which includes design and production of hydraulic, pneumatic and electronic components, assemblies and systems . . . and a great variety of processes, from high-precision forging to impact extrusion and every kind of quality machining.

If you have a new product in mind, why not call for specific information on how Thompson can help you build it?

From Thompson's 21 research centers and 25 manufacturing plants come, each year, important new advances in mechanics, electronics, hydraulics, pneumatics, aerodynamics, thermodynamics and nucleonics.

You can count on

Thompson TP Products

as a partner in solving the design and production problems of an advancing technology

General Offices, Cleveland 17, Ohio

WASHINGTON Business Front

JOSEPH R. SLEVIN

WASHINGTON, D.C.—It's been less than nine months since the Federal Reserve System dramatically shifted to an easy money policy, but it isn't too soon to start thinking about tight money again. Credit became easier as business activity declined, and credit will become tighter as business activity rises. Federal Reserve Board Chairman William McChesney Martin, Jr., believes that inflation got out of hand during the boom, partly because it got ahead of the monetary authorities when the last recession ended in 1954. He is determined that it won't happen that way again.

The move toward tight money will be gradual. It will take time, just as the changes toward easy money did. Bidding for loans will become more intense. Interest rates will rise. The pace of the changeover will be determined by the speed of the upturn. The swifter the upturn, the more rapidly money and credit will become tight.

The cheapest time to borrow is at the bottom of a recession. Interest rates customarily begin to climb before a rise in business activity has been detected. The longer business men, local governments, and other borrowers wait, the more their loans will cost.

No repeat for history

Interest rates will rise during the upturn, even though the volume of loan funds will remain large and may even increase. The Federal Reserve will try to assure the availability of sufficient money to support a healthy expansion of business activity. But it will try to prevent an excessive credit expansion that could create inflationary pressures.

This is not to suggest that the country will soon again experience the painfully stringent credit conditions that prevailed just before the Federal Reserve abandoned its anti-inflationary tight money policy last Fall. Those pressures were the end-result of one of the most powerful capital goods booms the United States has experienced. Corporations had lost liquidity, and so had the banking system. Mr. Martin and his colleagues want to prevent inflation. They blame last Fall's difficulties on the excesses that accompanied the boom. They hope that business men and bankers learned a lesson and won't get into the same situation again.

The central bankers are keenly aware that there are two big roadblocks between them and the achievement of their anti-inflation objective: They must spot the upturn when it comes, and they must have the courage to act decisively to initiate a swing toward tighter money. Neither job will be easy.

The Federal Reserve missed the turn by several months last time. It moderated the easy money policy in December, 1954, but didn't begin to apply the brakes in earnest until January 1955. It later found to its dismay that the upturn had begun in early Fall. That was how the boom got a head-start.

The monetary authorities are in deadly earnest when they say that having the courage to act will be one of their problems. The public is concerned about inflation, but making money tighter will not be a popular thing to do. Many business men won't like it. Neither will politicians who have a cheap-money bias. And there's the ever-present danger that a premature credit-tightening move might kill off a young recovery.

Those are the risks that must be run if the United States is to approach stable prices. Mr. Martin is prepared to run them.

The inflationary peril

The chairman believes that checking the next inflationary surge is the severest economic challenge facing the FRB and the country. He maintains that the hardest part of the central bank's anti-recession job was completed when it flipped the money market from tightness to ease. He is thoroughly convinced that inflation is the prime long-range threat to the American economy.

"The problem of the postwar world has been resisting inflation, it hasn't been creating jobs," Mr. Martin said recently. "If you want to grind the poor to pulp, the best way to do it is to pursue a policy of consistent inflation."

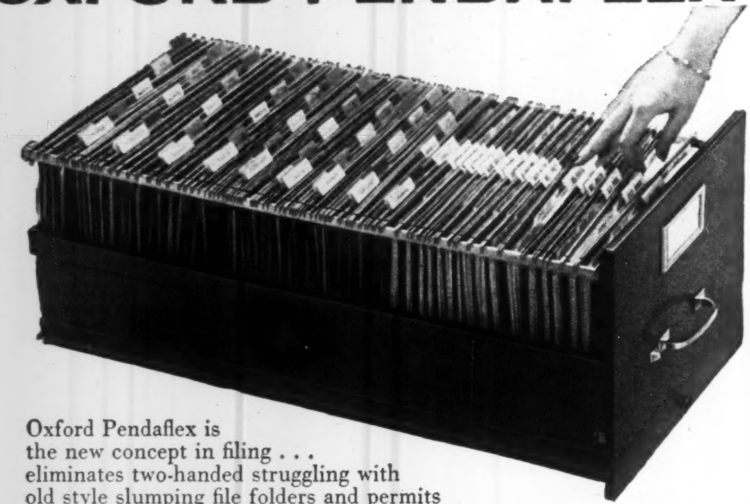
A group of Congressional Democrats, centering about Senator Robert S. Kerr of Oklahoma, has been trying to pin the responsibility for the recession on the FRB's restrictive monetary policies. They haven't weakened Mr. Martin's determination to strike sooner and harder when the next upturn appears. He does not believe that the central bank was too tough during the boom. In fact, he thinks it wasn't tough enough.

The Congressional Democrats have failed to make their case, and the FRB will begin its next anti-inflation campaign with greater confidence, more technical competence, and broader public understanding than it has had before. (It had been subordinated to the Treasury during the years when President Roosevelt was in the White House and during most of President Truman's tenure, and regained its independence in a celebrated "full accord" that was approved by Secretary of the Treasury John W. Snyder in March 1951.)

The 1955–57 boom marked the first time that the central bank had been free to wage an uninhibited battle to halt inflation. It was not a fledgling agency—the Board was established in 1913. But it was inexperienced. The FRB learned a good deal about its credit-control powers during the last boom. It gained battle experience, and it plans to put its new skills to use when the next upturn arrives.

Going it alone

Perhaps the most discouraging thing about the anti-inflation outlook is the prospect that the entire burden will fall on FRB credit policy. Monetary measures should be supported by a firm fiscal policy if they are to be fully effective. Mr. Martin has frequently singled out the lack of adequate budget surpluses as the biggest chink in the country's anti-inflation armor during the 1955–57



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boom. It now appears that the FRB will have to go it alone once again.

The Administration expects a $10 billion deficit this year, and it foresees additional, though smaller, deficits for several years to come. Spending is rising, and the impact of the recession on corporate income tax receipts will last into fiscal 1960—the year that begins next July 1. This year's deficit will help to counter the recession, for budget deficits are inflationary. But the deficits that are due to occur after recovery has been achieved will undercut the FRB's anti-inflation program.

The Government could provide a budget surplus in fiscal 1960 if it were willing to cut expenditures or to raise taxes. No one in Washington thinks it likely that the Administration will urge either step. It considers higher spending essential for national security. It didn't propose a tax rise during the last boom, and it believes the present tax rates are too steep.

In short, there's general agreement that the Administration will risk another round of price increases in preference to cutting expenditures or boosting taxes.

That means the budget will come into balance again only when economic growth and rising business activity combine to lift revenues above the spending volume. No one can predict when that will happen.

Are credit curbs enough?

All the FRB can do in a period of inflation is to bring pressure to bear on buying demand. It can limit the money supply and thus try to discourage business men and consumers from bidding up prices by making excessive use of credit. But it can't directly curb the price pressures that are generated by rising costs.

Some economists have come to believe that mounting costs will inevitably push prices higher as long as the country enjoys full employment. They maintain that buying demands will be so strong in prosperity that producers will be able to post higher prices and make them stick—even if the FRB succeeds in keeping a tight rein on credit. They contend that FRB curbs, while they may knock out marginal buying and perhaps slow the pace of the price rise, cannot bring it to a complete halt.

The central bankers disagree. They reject the cost-push argument and insist that inflation can be stopped if demand is held in check. More will be known after the next upturn gets under way. END

"T-1" Steel opened new markets, improved our competitive position

says Mr. James V. Coulter, President,
Coulter Steel and Forge Company,
Emeryville, California

This is the story of how one manufacturer made use of the exceptional properties of USS "T-1" Steel to win new business, get the jump on his competitors, and build better products.

USS "T-1" Steel has nearly three times the yield strength of structural carbon steel. It has exceptional toughness, even at 50 degrees below zero, and outstanding resistance to impact abrasion. In addition, it can be forged, heat-treated, welded, flame-cut and worked with the usual shop equipment.

This extraordinary combination of properties gave Mr. Coulter and his engineers a lot of ideas on how to improve their products. They started using USS "T-1" Steel in forgings used at sub-zero temperatures—crane hooks, shovel teeth, boom parts and shafting. They took advantage of the steel's greater strength and resistance to impact abrasion to make mining equipment parts lighter, stronger and more durable.

Word got around to customers. Business has expanded and the company now works two shifts a day to keep up with orders.

Why not get the facts on what USS "T-1" Steel can do for you? Write for your copy of our comprehensive "T-1" Steel booklet. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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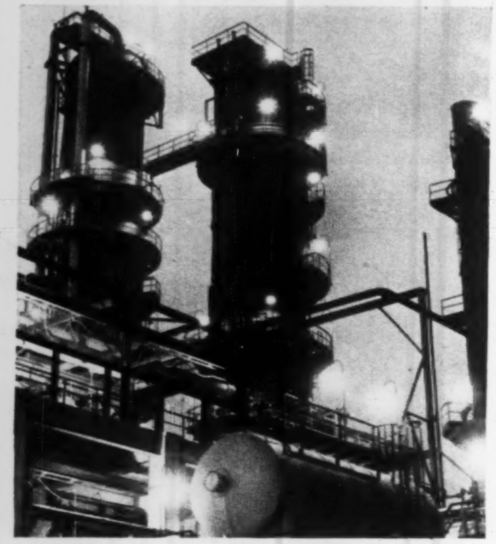
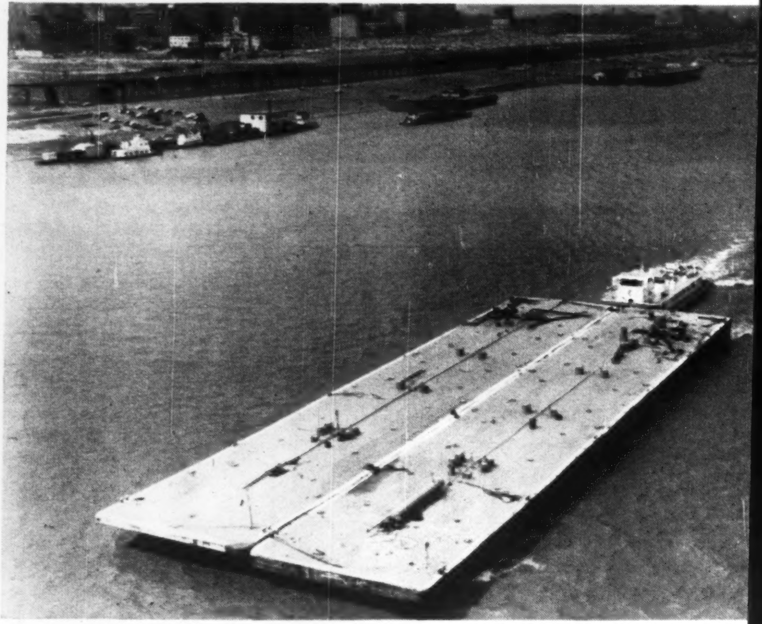
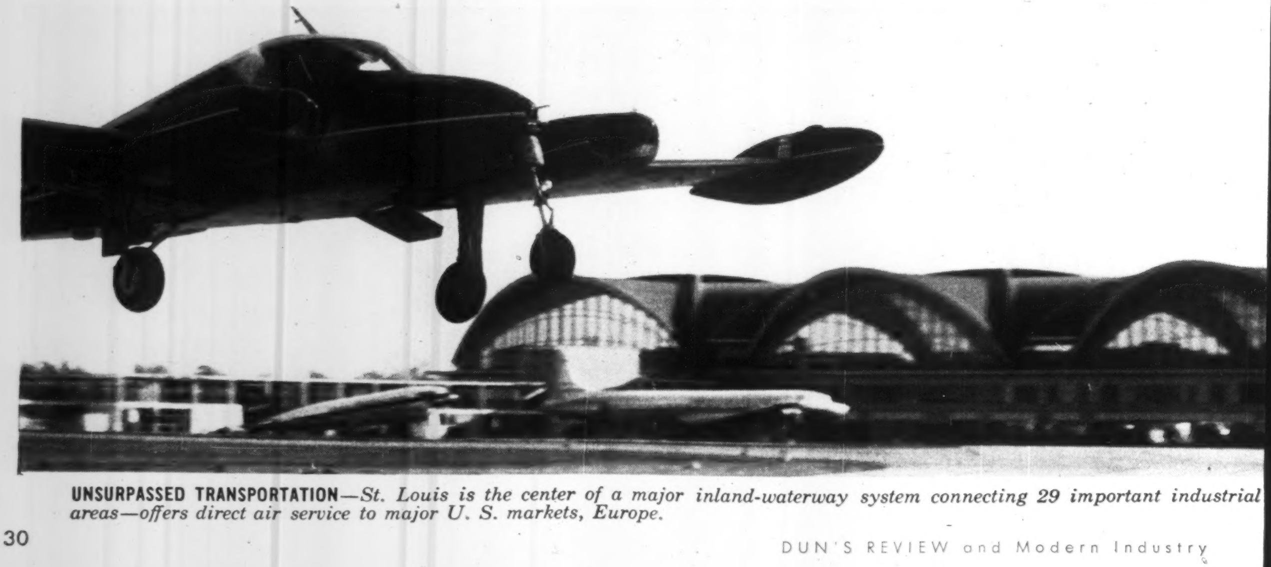


MAJOR CHEMICAL CENTER *produces a wide variety of chemicals, allied products. Raw materials come from nearby mineral, agricultural resources; by-products from industrial processing.*





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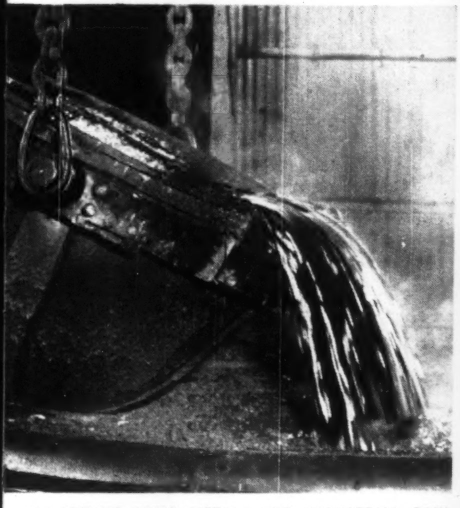
Center of America

economic stability that's the solid foundation for good living, a wide variety of activities and recreation.



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Transportation Center . . . Your choice of rail, air, truck, or barge lines which fan out from a truly central location. St. Louis is near both the geographic and population center of the nation.

Plenty of Water . . . The Union Electric area is one of the very few choice industrial locations with an unlimited water supply.

Plenty of Labor . . . Widely diversified industry and a surrounding agricultural area provide a great variety of skilled workers and a growing new labor supply.

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Excellent Business Climate . . . The unusually well-diversified industrial community of St. Louis is creating ever-expanding business opportunities under a new and progressive civic leadership.

Choice Industrial Sites . . . Industrial development corporations like the Page Industrial Center and the new Meramec Industrial Development Corporation are developing land for commercial and industrial use and have choice sites available for immediate occupancy.

You are cordially invited to write to me for comprehensive information about the Union Electric area or specific information about plant locations. Your letter will receive full and completely confidential consideration.

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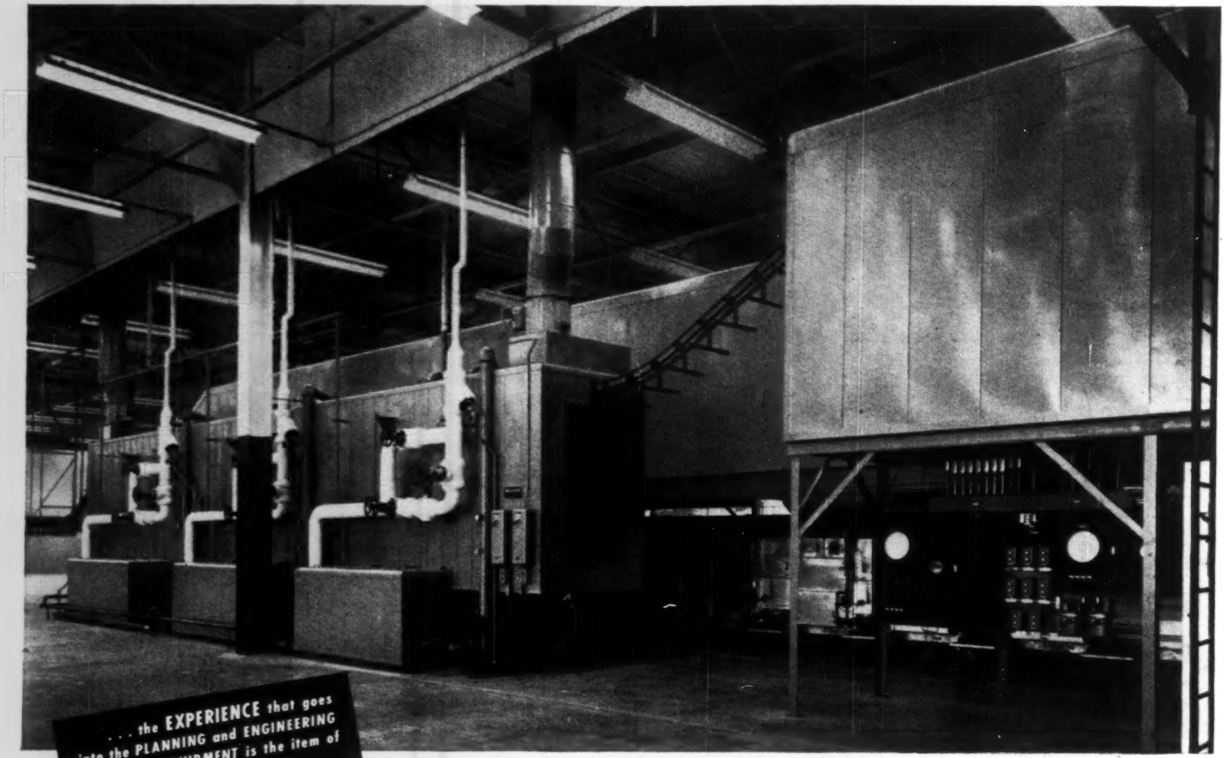

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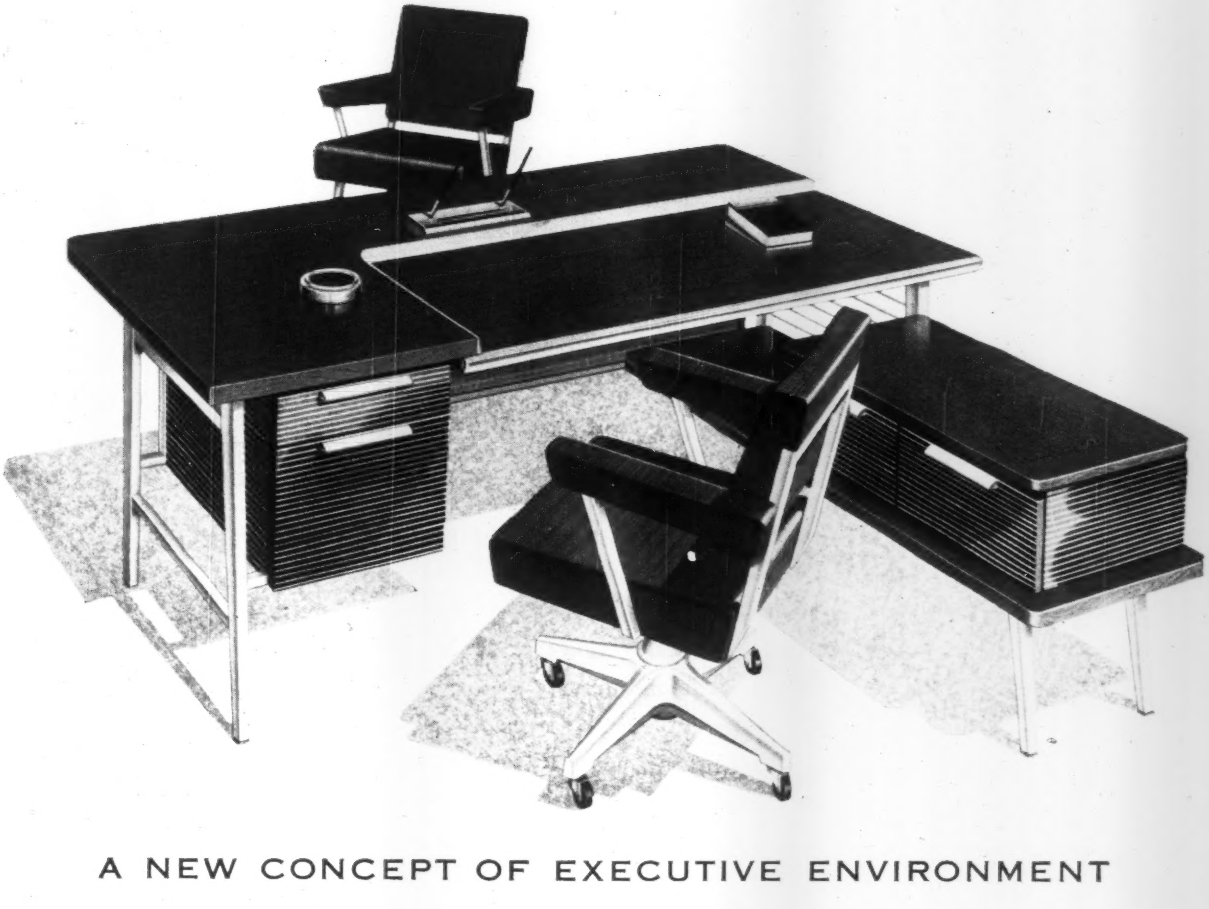

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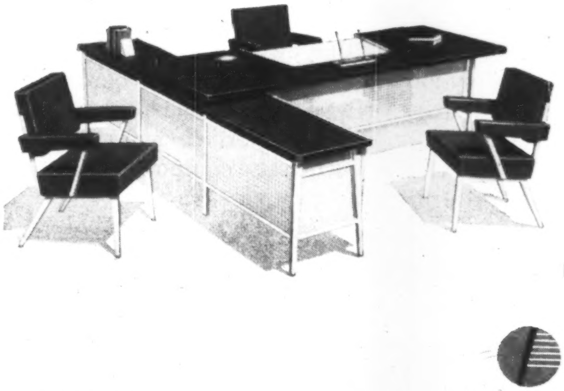

. . . dramatically achieved through the tasteful intermingling of exciting new materials, colors and design. Limitless in variation, Italic Styling can be tailored to the precise character of the business — the personality and taste of the executive.

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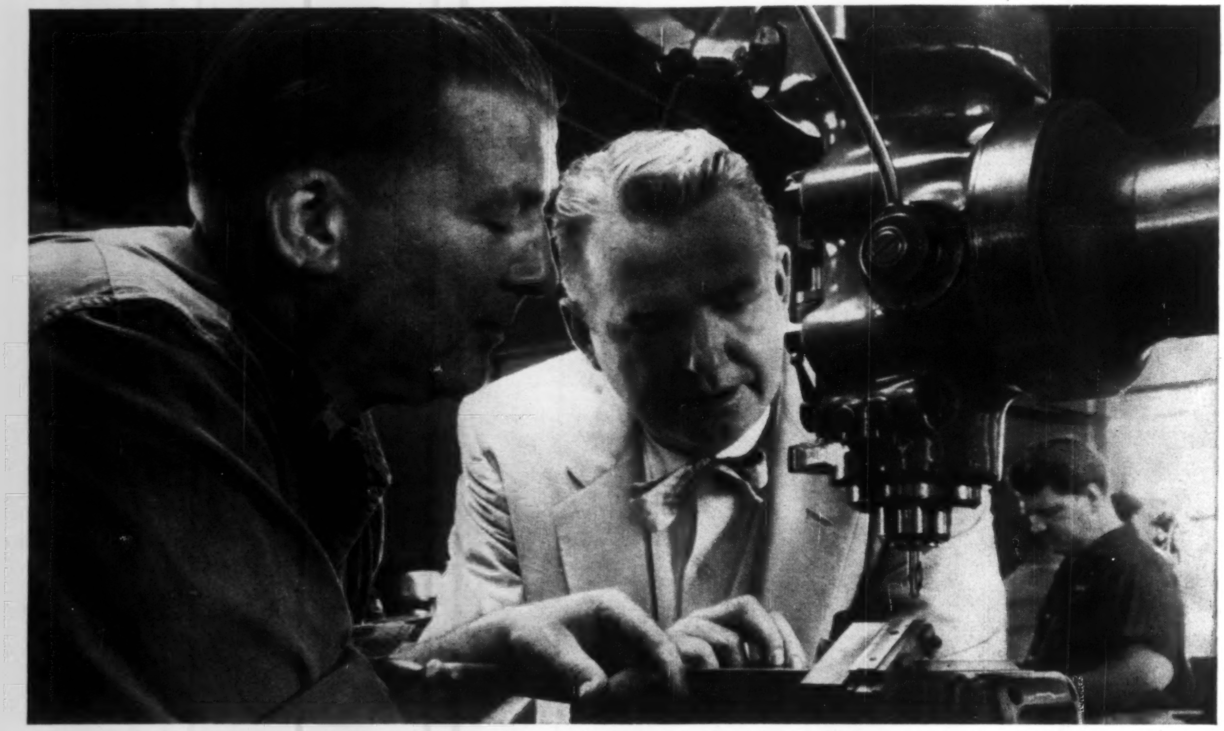
***Italic Styling* BY GF STUDIOS**



Walter Jenkins of Allentown, Pa., (left), whose business doubled since he became a Western Electric supplier, meets with W. E. purchasing representative.

IN 1958 WESTERN ELECTRIC WILL BUY $1 BILLION WORTH OF SUPPLIES AND SERVICES

33,000 companies—mostly "small businesses"—will help us move forward!

Yes, *this year* we'll spend a billion dollars with the 33,000 suppliers who help us do our job of providing telephone equipment for the Bell System, and fulfilling our defense contracts with the government.

The money will go to every state in the Union for equipment and supplies manufactured by others that we buy for the Bell telephone companies in our capacity as supply unit of the Bell System . . . and it will buy raw materials, products and services needed by Western Electric factories in 26 cities where we manufacture equipment.

We expect the future to be bigger and better than the present — or the past. We expect this . . .

—because in a decade or less the U. S. population will have increased by some 30 million people.

—because people are appreciating more and more the convenience of having additional telephones.

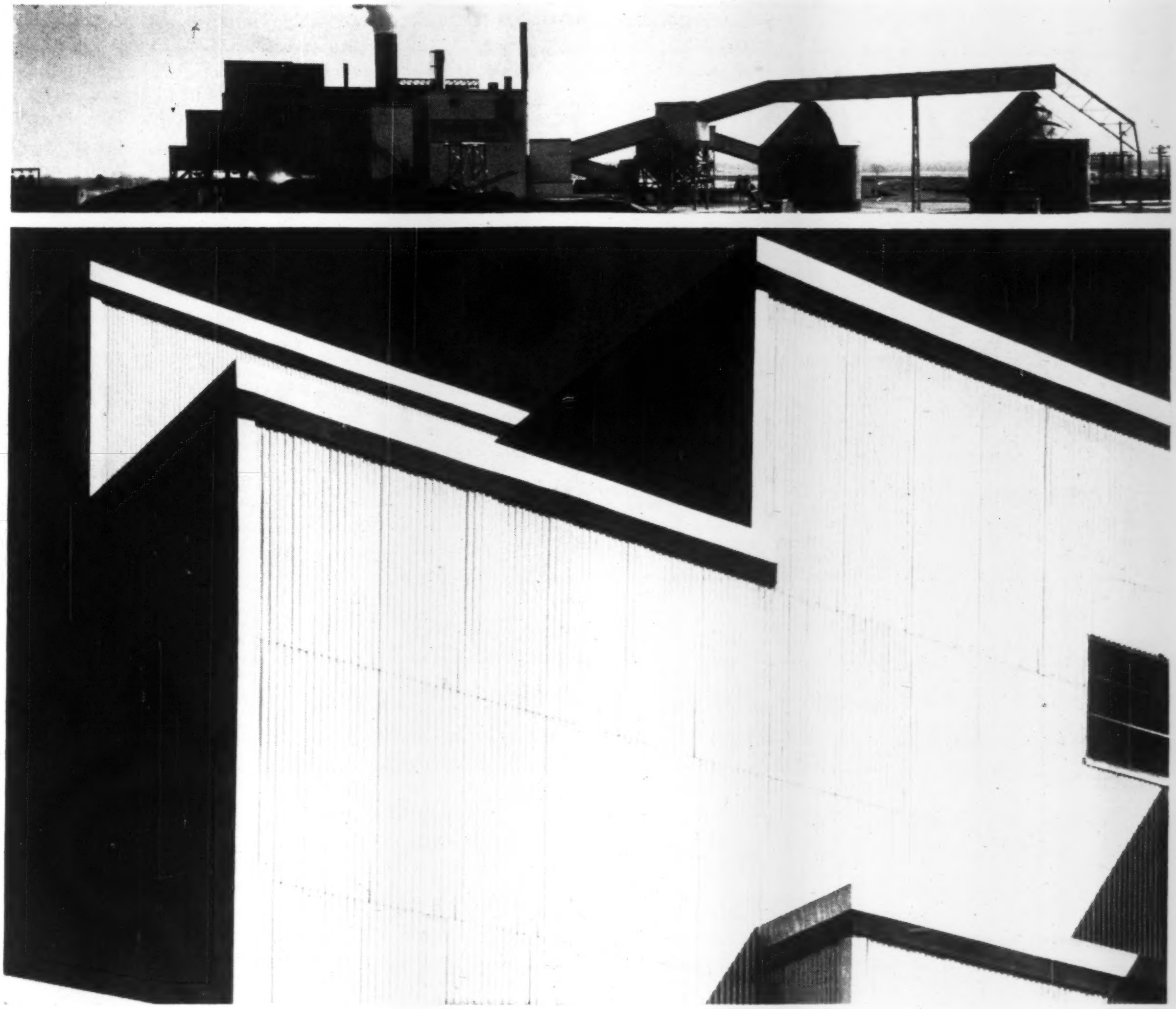
—because American industry can't stand still—and to progress, industry relies on telephone service.

Nine out of ten of our suppliers are in the category of "small business" with fewer than 500 employees. They are located in 3,200 cities and towns in all of the states. In addition, transportation services are being provided by 3,000 other firms.

We need the help of these suppliers' special abilities in performing our own large manufacturing and supply jobs: providing dependable equipment needed by the Bell telephone companies to give ever-improving telephone service, at reasonable cost . . . and providing defense equipment and services called for by the government.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM



The Peabody Coal Company River King washing and preparation plant at Freeburg, Illinois is entirely covered with corrugated Stainless Steel sheets. By specifying Stainless, Peabody practically eliminated maintenance costs even before the plant went into operation.

This building will never need paint

Peabody Coal Company covered their entire coal preparation plant with corrugated Stainless Steel sheets. It was the most economical material to use!

Around a coal plant like this, corrosion takes a heavy toll of equipment and buildings. In time, the cost of maintenance—repainting and replacing corroded sections—is greater than the original cost of construction.

But the Stainless Steel Peabody plant will last indefinitely, with little or no maintenance, because Stainless Steel has unsurpassed corrosion resistance. It will never have to be painted and it will stay bright and clean with just an occasional washing.

They use a lot of Stainless Steel inside the plant, too, because Stainless is extremely tough and has more resistance to abrasion. It will add years of life to dryer screens, chutes, sluices, hoppers, conveyor bottoms—all equipment that calls for good wearing qualities and corrosion resistance.

Peabody engineers knew that their investment in Stainless Steel was good economics . . . because *sometimes it costs less to use a steel that costs more.*

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United States Steel Supply — Steel Service Centers
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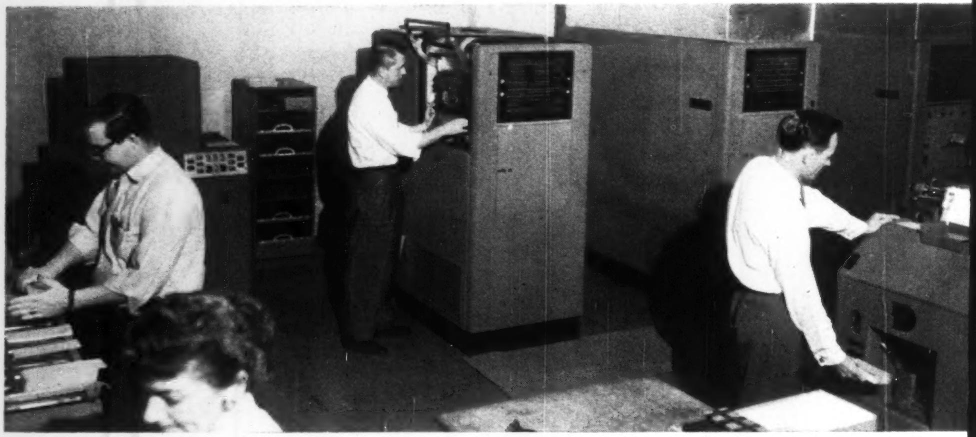
USS **United States Steel**

AUTOMATION, 1958:
Industry at the Crossroads

JOHN DIEBOLD



WORKING *medium - size computer installation is exemplified by this Remington Rand Univac File Computer set-up, which handles inventory and billing at Associated Grocers, Phoenix, Ariz.*

I. THE RECORD TO DATE

DAMON RUNYON'S character Harry the Horse once remarked on reaching the track: "I hope I break even today—I need the money." Faced with the worst profit squeeze in over a decade, corporate presidents, treasurers and comptrollers are saying what amounts to the same thing about their ventures into automation. Their gloomy outlook today is in sharp contrast to the glowing expectations with which most automation programs were undertaken only a few years ago.

Automation, as a word and a fact, is less than ten years old. Yet it has inspired millions of words of copy on every continent, in every medium from comic books to learned journals. It has been the subject of two Congressional hearings. Labor and management have fought over its implications. Hard-headed business men have spent millions of dollars on it. It has been called a second industrial revolution—with all the implications of profound economic and social change which that phrase holds.

Unrealized hopes

But the revolution has not really got off the ground. Business men—even those who were willing to settle for less than a revolution if operations were improved or money saved—have been disappointed. In business after business, installations have not lived up to expectations. Savings have not materialized. Planned applications have been abandoned. Operations have not been speeded up. Inventories have not been reduced, and management reports have not been improved. All these goals—modest enough, certainly, when they are stacked up against a promised revolution—seem to remain maddeningly just out of reach.

What is one to make of it when a well-organized, adequately financed, highly skilled producer of auto body frames, with a long and distinguished record of pioneering in advanced mechanization techniques, loses nearly $10 million on an automated assembly line? Or when a major utility company announces publicly, a year after installing a large scale computer, that the program—two years in preparation—has been scrapped and the machine returned to the manufacturer, because those responsible for the installation had underestimated the running time of the daily billing cycle? What is the explanation when a small manufacturer of computers loses $7 million pursuing the will-o'-the-wisp of a "burgeoning new market"? Or when three old line office equipment suppliers beat a public retreat from the field a few years after launching widely heralded computer programs? To these companies it must have seemed that if the revolution was going anywhere, it was going backwards.

Has automation been overrated? The survey results charted on this page indicate clearly enough that management is having its troubles in at least one area of automation—electronic data processing. There have also been real difficulties with factory automation programs. Yet few managers have gone so far as to say that automation has actually been overrated and oversold.

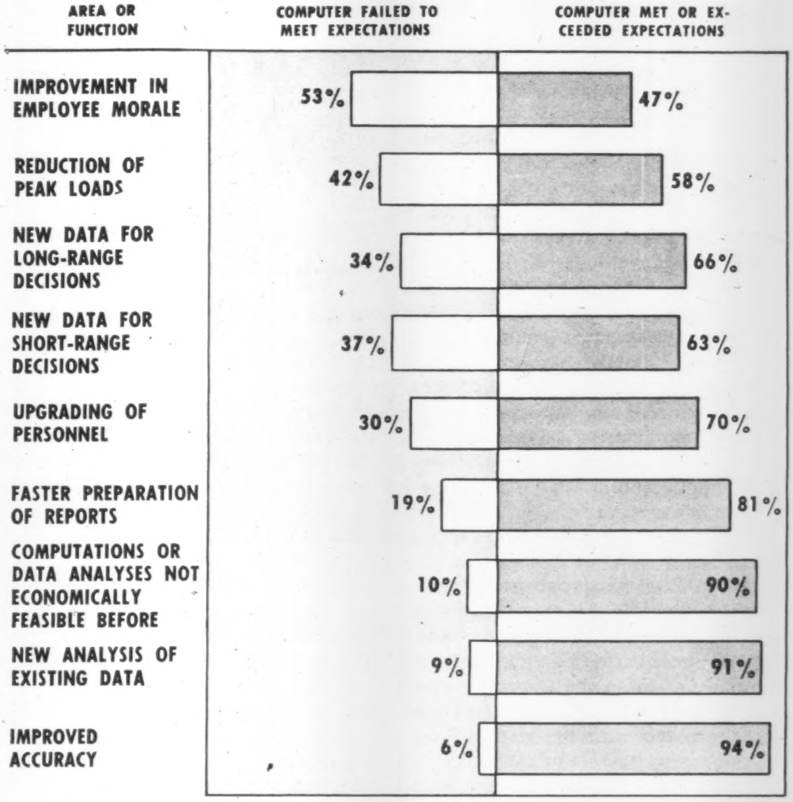
Management myopia

Rather, the task of putting automation to work has been underestimated. Though their initial enthusiasm may be dampened, few management men who have looked seriously into the potential of automation feel that anything short of a revolution is involved. Most of the troubles encountered to date can be traced to a serious, and nearly universal, tendency to underestimate the problems of application, complicated by a lack of performance standards for measuring progress. Fortunately, some companies have already recovered enough from the initial setback to start developing better tools for control of their automation programs.

This refusal to succumb in the face of genuine disillusionment is a fortunate thing for our nation. For us, automation can solve the dilemma of guns or butter. It can provide us with both—in adequate quantity. We in America once took this for granted, but today we can no longer do so. The Russians too are rapidly increasing their productivity, primarily for military purposes. In the U.S.S.R., automation proceeds under the planning and direction of a newly formed Automation Ministry. Here, its progress is governed by the individual decisions of individual business men, with the acquiescence of powerful groups such as labor.

Expectations vs. Experience

This chart and the one below summarize some key findings of a survey conducted among 280 users of automatic data processing equipment by the author's organization.



It is one thing to stay ahead in the technological race, to develop new products and techniques faster. Since Sputnik there has been a great deal of public clamor over this problem. Even though not much has been done about it, a certain awareness of urgency does exist. But over a longer period, say twenty years, it is equally important to keep pace in the application of technological achievement to everyday industrial and commercial activities. Until now capitalism has an enviable record in this respect, and we must not allow changes at home and Soviet advances to mar it.

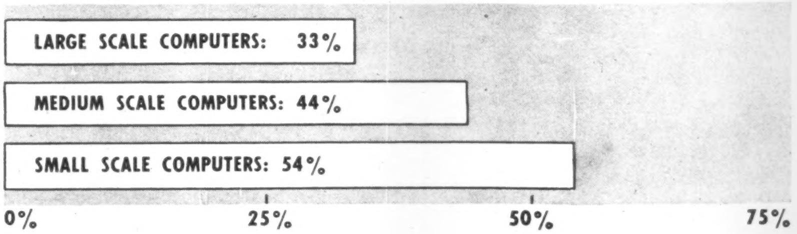
We must look at automation in perspective, not allowing either the present recession or the warnings of labor leaders to put an unwarranted check on our progress. It is often wise to retreat from an overextended position, and some automation programs are clearly overextended. But this prudence can be overdone. It would have been a calamity if the first man who got burned had made the human race afraid to use fire. Business men must not let present disappointments interfere with future investments in automation—when good times return. More important: where economical, business must continue to invest in automation now, despite present economic conditions. And, at the very least, planning for future automation programs must not be set aside. Planning itself can be an important investment.

Realism and the long view

This is especially true in view of the fact that the present recession is really rather a mild one—of a kind that we can expect to be living with on and

The Harsh Awakening

Bars show percentage of companies whose installations fell short of hopes.



off for a good many years, given our economic system. And automation involves a type of long-range project that cannot safely be interrupted each time business declines. The lead time for success is simply too long to be keyed to short-range economic fluctuations.

Most effective in preventing such reactions are management men who, although they are currently caught in the squeeze, are at the same time maintaining a constructive view toward their programs. Probably the single factor most responsible for the current "reevaluation phase" is the lack of management planning for automation. Though the recent talk about "planning" may sound esoteric to many managers, automation calls for new management techniques and, therefore, requires detailed, long-range planning of human and material resources.

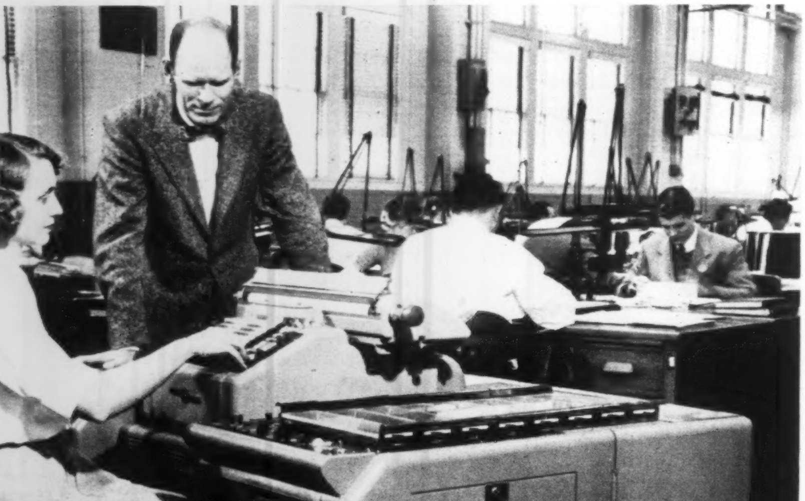
Facing the facts

Automation has progressed furthest in the office. More than 2,000 internally programmed computers have actually been installed. Unfortunately, many of these are causing a good deal of grief. Caught with their budgets down and with the responsibility of enforcing cost reductions on the rest of the organization, many comptrollers are red-faced about the cash drain of their own computer centers. The usual result in such cases is a short-term solution that results in misuse of the computer's real capabilities in an attempt to reach that rosy goal, the black area above the break-even point.

THE AUTHOR • John Diebold, who at the age of 32 enjoys an international reputation as an authority on automation, concerns himself chiefly with the management and organization aspects of this rapidly expanding field. He is founder and president of John Diebold & Associates, Inc., a consulting organization with world-wide professional practice in automation and automatic data processing, and the author of *Automation*, one of the first authoritative books in the field.

Automation remains a shining promise, and nearly everyone is convinced that for business it does represent the road of tomorrow. But this is little comfort to financial officers who are faced with a computer center's ravenous appetite for cash *now*, and whose earnest efforts to reduce costs by normal efficiency and economy methods seem almost futile in the face of this real fixed cost. When management is faced with high monthly rentals, annoying problems of data verification, the monumental task of computer education throughout the company, and dependence on programmers who leave to have babies, the benefits of a computer program can seem very long-range indeed.

In the deep-carpeted, pastel-colored, air-conditioned and humidity controlled manufacturer's computer center, it is easy enough to see clearly the shape of the bright new world. A realistic idea of the efforts required to reach this vision comes first in one's own computer center, with strange lights flickering in the midst of a payroll preparation, staff insufficiencies, and the memory of a golf partner's comments about the success of *his* program. Under these circumstances, the administrator may feel that he is turning away from reality when he maintains a positive view of the future.



THIS DESK-SIZE *Burroughs electronic digital computer is used as a small "brain" by the United Aircraft Computation Laboratory, East Hartford, Conn., to assist a big computer.*

The real conflict between long-term management planning and the short-term profit squeeze is vividly displayed today as companies wrestle with their computer programs and their automation investments. They are paying the price of too much fascination with the hardware of automation and too little understanding of its management implications and the basic organizational changes that are needed to make it work. Indeed, many companies have had real difficulty keeping their machines at work. Unused computer time is in fact available at other places than the manufacturers' service bureaus—often at lower rates. The differentials offer some measure of the original failure of management planning that brought the situation about.

Trial by recession

The current recession and widely publicized disillusionment with automation came about the same time. An unexploited computer that represents future potential in a boom period can quickly turn into a high fixed-cost headache in cost-cutting times. This has at least one good result: top management finally starts to take real interest in the computer program. Unfortunately, this interest often ends in short-range thinking that spells trouble in the future. Further, the resulting disillusion can permanently scare other companies away from automation. In either case, the need is for sensible planning. Those who can do it at their leisure are lucky; those who are plugging a cash drain must work fast, but they should keep a broad and realistic perspective.

Automation is much more than just a technical problem. Purely technical matters do not usually faze modern business. But automation confronts management with a change in organi-

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II. THE SHAPE OF THINGS TO COME

FORESHADOWING AUTOMATIC CONVERSION *of computer output into graphic form for faster comprehension, this Benson-Lehner X-Y Plotter (center) is used at Fairchild Engine Division of Fairchild Engine and Aircraft Corp., Deer Park, N.Y., for graphic comparison of engine test data. Here, an intermediary device called a reader (left) is necessary to translate punched-card output of IBM 653 computer (right) into electrical impulses which then cause print-head (arrow) to trace data on graph paper automatically.*

NOT TEN YEARS AGO a noted authority predicted that "fewer than a dozen electronic computers will be able to satisfy the entire computational requirements of the country." Whether use of a computer would have improved the accuracy of this forecast will never be known—but today more than 240 large-scale and 1,000 medium-scale computers have already been installed in American businesses, and more than 3,000 more are on order.

Any long-range prediction concerning automation is bound to have some Buck Rogers overtones. The trick is to separate the genuine trend of science from the idle speculation of fiction. Fortunately, it is already possible today to pick out certain developments that will affect the future. Interestingly enough, the most significant of these are the least publicized. The overriding fact is that today's machines are only the primitive forebears of the silent, compact new devices of the future. A few years hence they will seem as outdated as the dinosaurs.

Though they may seem far removed from the practical problems of running a business, it is the military applications of automation that carry the seeds of the innovations that will shape our business future in the next two decades. Some of the great inventions of Leonardo da Vinci originated in his attempts to solve military problems. In his age, military technology originated the concepts that the crude industries of the time used to build the tools of war.

A significant shift

The sequence changed during the first industrial revolution. Business originated technology, and the military followed. World War I was begun with the weapons used to fight the Franco-Prussian War in 1870. It was only later that the military realized we had entered a new age, in which military science must originate technology—not merely copy. A striking, though little recognized, fact of today's new industrial revolution is that the military has again taken the lead in the development of technology—for the first time in 300 years. That is why military developments will set the pace for business. Though it took 300 years to realize some of Leonardo's concepts—the airplane, for example—it is scarcely a decade since the electronic computer, designed for the military calculations of World War II, has become a common office sight.

The future form of automation is discernible less from today's machines than from the concepts, since automation is more a conceptual revolution than a particular set of new inventions. We must look to the breakthroughs in science and the new concepts in technology for shape of things to come.

1. Office and plant will be linked.

The office and the plant are being drawn closer and closer together by automation. Information handling is the heart of the new technology. This has always been the task of the office, though that task has often been misdefined as the handling of bits of paper. Less apparent in the plant, it is nevertheless the information about production processes that must be used to control those processes. Until now, this has been a human function. Though office computer systems are now common, the cost of data preparation is still as great as the cost of data processing. The development of special input equipment—for taking data directly from production processes and putting it into a form that can be handled by machines—will be one of the great challenges of the next decade. The basis of integrated data processing, so fashionable a year ago, was the principle that information should be derived as *a by-product of business operations*. The same principle is at the heart of developments to come—in deriving data from production processes, as well as from retail sales, order writing, and travel reservations. Many technological problems remain to be worked out if we are to solve the most pressing need of today's data processing. The elements of a solution are already at hand, but further development and evaluation of the systems concept remain to be carried out.

2. More system output will be graphic.

Today's data processing systems generate large quantities of numerical data. Yet most business men find it easier to comprehend the relationship between statistical series, and changes in rates of statistical series, by looking at graphs and curves.

Automatic graph-plotting equipment actuated by punched cards is now being used for scientific and mili-

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By 1950, annual wage increase principle embodied in 1948 GM-UAW contract was solidly established.

Can Industry Control the Annual Wage Increase?

JOHN W. JORDAN

Can industry break free of the vicious inflationary spiral of "productivity" wage increases that push prices up year after year? The answer may well be squarely up to management.

FOR TODAY'S typical wage-earner, the American dream of perpetual progress, with its contemporary images of gaudy, fin-tailed Detroit monsters, of color TV replacing black-and-white, and of ever more frequent holidays on a vacation-now-pay-later plan is rosily illuminated by the virtual certainty of an annual wage increase. Sweet as the dream might be for recipients of the annual bounty, it is taking on a nightmarish hue for many company managements struggling with high labor costs. And the prospect of a permanent wage inflation promises to blight the picture for both management and labor.

Despite current economic conditions, we are witnessing the extraordinary phenomenon of a steadily rising wage scale. During recent months, substantial wage increases have been granted in such diverse industries as leather, chemicals, electric utilities, aircraft, glass manufacturing, and apparel. These increases have created the impression that big business and organized labor are engaged in a joint effort to ignore, if not repeal, the law of supply and demand. Despite the obvious decline in consumer demand, manufacturers are stubbornly resisting price cuts. Conversely, labor leaders demand even higher wages regardless of the present surplus of manpower. In effect, both big industry and big unions are doing business as usual. Following procedures which have been firmly established in recent years, both parties continue to ignore the consumer. How has this happened?

Over the past decade a fundamental change has been taking place in the psychology of both labor and management with respect to wages. Very simply, the annual wage increase is no longer a matter of economics; it has become a matter of right. For all practical purposes most organized companies, particularly the small and medium-size ones, have lost control over their wage rates and fringe benefits. The techniques which precipitated this state of affairs are thoroughly standardized by now. Most common are the practice of pattern bargaining and the principle of the "productivity increase," or annual improvement factor.

Pattern bargaining reflects the practical unionist's concept of the nature of human labor. It differs strikingly from what might be called the legislative or idealistic concept. Thus, Congress, in exempting labor unions from the operation of the antitrust laws, solemnly declared in Section 6 of the Clayton Act that "the labor of a human being is not a commodity or article of commerce." The irony of this, of course, is that pattern bargaining is based purely and simply on the premise that the labor of human beings *is* a commodity which, like any other commodity, has a going price.

Salesmen of labor

No one who has ever represented an employer in union negotiations can have the the slightest doubt that union negotiators see themselves as the power-backed salesmen of a commodity, the labor of the workers they represent. They fix a price on what they are selling just as the merchant does for the stock on his shelves, and they demand the going price. The latest price or pattern is usually set in a much-publicized negotiation with a large and successful producer. Thereafter, all organized producers in the same field—large, medium, or small, profitable or unprofitable—are expected to meet this so-called pattern. In applying the pressure of this approach, organized labor exhibits little or no concern for such realities as relative profit margins or competitive efficiency. Unions frequently ignore whole segments of a particular producer's problems, such as the temporary or permanent loss of a lucrative market, shortages of materials essential to profitable operations, low productivity, and so on. "Why, Mr. Manager, should you pay any less for your labor than your competitors? You have to pay the same power and freight rates as everybody else, do you not? Why should your employees be treated any differently from your coal supplier? He gets the going price. So should your employees."

So goes the classic argument in pattern bargaining. Labor, in other words, has its price like coal, chemicals,

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The Case of the Missing Output

How sound are the currently accepted definitions of productivity—on which union wage demands are often based?

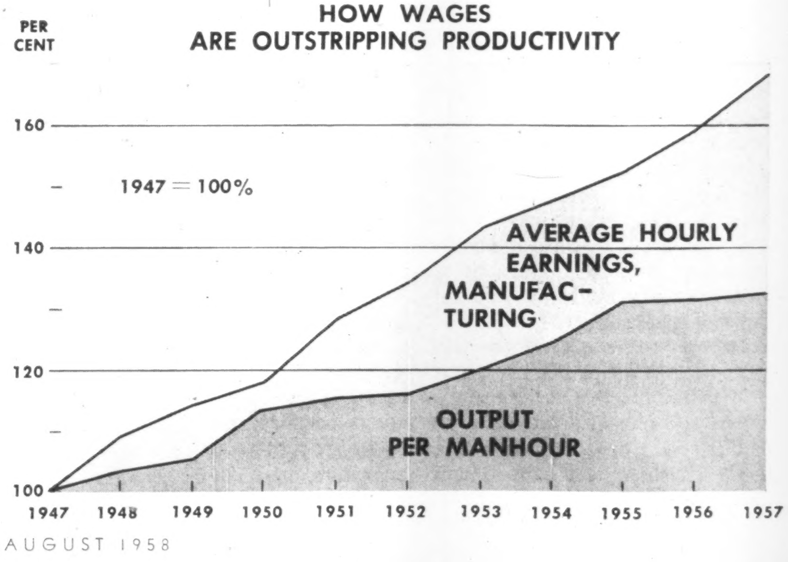
Federal Reserve Board economist Murray Wernick, in analyzing the index on which "productivity" is based, says industry has actually overestimated productivity increases "which can be distributed in the form of higher wages without increasing unit labor costs."

In a recent speech before the American Statistical Association, Wernick warned that, in estimating productivity, industry has failed to account for the tremendous growth of "nonproduction" workers, i.e., scientists, technicians, professional workers, and the like. These nonproduction-line workers increased by 55 per cent (or 1.4 million) between 1947 and 1957, while production-line workers increased only 1 per cent (or 125,000).

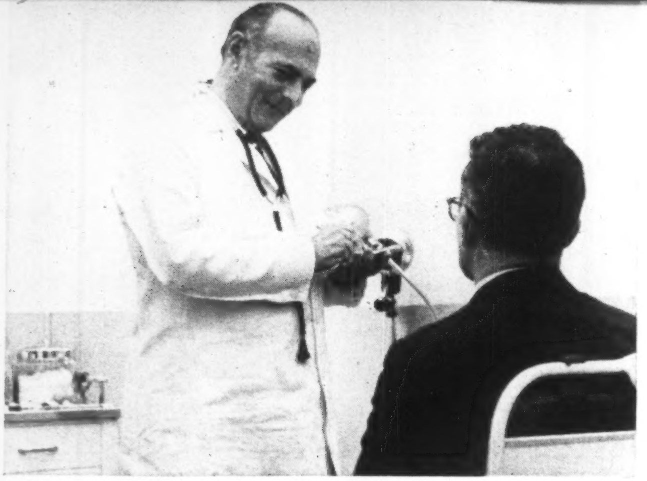
Though these nonproduction workers may be responsible for future gains in output, at present they appear actually to be dragging output down—in a relative sense, at least. For instance, counting only production-line workers, Wernick estimates that productivity increased at an annual rate of 3.7 per cent since 1947. Counting all workers, the figure drops to 2.9 per cent. Thus, total payrolls and total employment have risen without commensurate advances in productivity.

Says Wernick, "With nonproduction-worker manhours rising more rapidly than output or production-worker manhours, the rate of increase reported in productivity is significantly lower and unit labor costs are substantially higher if an all-employment manhour series is used to measure labor input."

In short, the index now used to measure output is misleading. Since this index has formed the basis for wage boosts, it seems a sound inference that management would do well to re-evaluate real output before accepting, even in principle, the union method of measuring productivity.



⇦ *Because of varying definitions of productivity, the difficulty of calculating the precise contribution of so-called "indirect" labor to the product, and other problems of method and approach, a simple yet precise comparison of productivity increases and the rise in wage rates is difficult to make. The question, however, is mainly one of degree—and this chart, based on data from the Department of Labor's Bureau of Labor Statistics, provides a fair, if necessarily approximate, picture of the trend.*



AWARE THAT *executive health is one of their most valuable assets, a growing number of companies are encouraging annual physical examinations for all their management personnel.*

Executive Stress Needn't Kill You

How to Stay Healthy Though Overworked

J. S. FELTON, M.D.

A top-heavy workload needn't shorten your life or impair your effectiveness—if you learn to practice a few simple health principles that can help you to adjust to job stress rather than escape it.

A CUSTOMER WALKED into a small Tennessee hardware store and poked around on the dusty shelves. Finally, the proprietor, from his high stool in the corner, asked what she wanted. "Potato ricer? Sorry, ma'am," he said. "Never heard of it." And he went back to sitting and thinking.

That was years ago. Yesterday's small-town owner-manager was strikingly different from the modern executive. He was unhurried, indifferent to methods and procedures, unworried by demands he could not meet. He had no "personnel problems," since he had few personnel and could hire and fire at will those he did employ. But modern production methods and marketing techniques, and the wide distribution of nationally advertised merchandise, have changed all that.

Today's executive is seldom his own boss. He must work through others, both above and below. He often has to solve complex business problems through group action—and solve them quickly. Because of this, he is exposed to many kinds of physical and psychological stress.

According to modern medical thinking, stress is the primary cause of illness. It's true that bacteria, viruses, chemicals, and physical strain are all agents of stress. But stress is also due to purely psychological causes, and these are probably the greatest threat to the health of the modern executive.

Grim reports of death at the executive desk or on the golf course make the headlines with such frightening frequency as to raise serious questions about executive health. Is the executive chronically ill? Does he have more than his share of the diseases caused by psychological stress—coronaries, arthritis, peptic ulcer, obesity, asthma, high blood pressure, emotional illness?

Just the facts

Many reports from doctors who have examined large groups of executives indicate that, more often than not, the executive's health is below par. Diseases believed to be fostered by psychological factors are in good part responsible.

One series of examinations of 149 executives disclosed the following:

- 36 per cent were found to have cardiovascular disease
- 39 per cent had endocrine or glandular disorders
- 25 per cent suffered from obesity

- 2 per cent had malignant growths
- only 20 per cent were free of both major and minor defects.

In another group, 40 per cent were overweight, 15 per cent had high blood pressure, 10 per cent had heart disease, and 5 per cent had prostate trouble. Some 60 per cent had defects, and the majority of these had been unaware of it.

Studies of larger groups show similar results. At one institution where more than 5,000 executives from 30 companies were examined, over half of those in the 45-to-60 age group suffered from heart disease and obesity.

The Mayo Clinic, reporting on a series of 231 executive examinations, found positive evidence of major or minor illness in 84 per cent. The diseases most commonly observed in the Mayo report were:

Obesity	35%
Hypertension	15%
Duodenal ulcer	10%
Hernia	10%
Heart disease	7%

Needed: more perspective

Many concerned with industrial health wonder if the executive is really more subject to organic disease than others. The "big business man" is always good copy. The statistics just cited—and others like them—have been publicized widely because they confirm the popular view that the executive life is full of stress.

Although a considerable body of data on executive health is available, few comparative studies with non-executive groups have been published. Some, however, can be found.

A study in one of the large chemical companies showed that the only disease significantly higher among executives in the 50-and-over age group was ulcer of the stomach or duodenum. Heart disease was three times more frequent than the average among the younger executives (age 35–49) but three times less frequent in executives over 50.

When the medical director of a Western oil company compared 100 employees with histories of coronary occlusion (heart attack) with 200 other workers of the same age in the same occupational classifications, he found little correlation of job level and occupational stress. The real offenders were sedentary living and poor health habits.

Available data show that the executive suffers a good deal from stress diseases characterized by physical change, but no more so than others of the same age in less responsible positions. The men in high executive positions are generally in the 40-to-65 age bracket, when the degenerative diseases begin to take their toll. Age, rather than occupation, therefore, is a large part of the problem.

The reports of executive susceptibility to emotional illnesses are not so sanguine. Recent years have witnessed a flood of articles with such ominous titles as "Health Under Pressure," "The Executive Neurosis," "Emotional Problems Among Executives," "Psychiatry for Executives," and "The Executive Crack-up."

The successful business leader's composite portrait indicates inevitable

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Too Much Tension?

Have executives begun to learn how to cope with the emotional problems of their jobs, put in less overtime, and take the stress in stride?

Findings of a recent large-scale survey run counter to many earlier studies which have shown the typical executive as harried and overworked. If there is too much tension in the executive job, the results show, most executives are unaware of it, or at least are unwilling to admit that it exists. The vast majority claim that they like their work, feel secure in their jobs, have no serious conflicts with superiors or associates, and seldom put in excessive overtime. What business entertaining they do in their off-hours they seem to enjoy.

The survey was conducted by the Life Extension Foundation, Inc., a nonprofit organization established in 1953 to conduct research and education in the field of preventive medicine, and a subsidiary of Life Extension Examiners, which has provided periodic health examinations for thousands of executives since it was founded 45 years ago. Questionnaires were sent to 10,000 executives, and some 6,000 of them replied. Responses came from men in 179 companies in 25 different industries, from every state in this country, Canada, and twelve foreign countries.

Only 13.3 per cent of the 6,000 state that they are under constant tension, and answers to the other questions indicate that their situations do not produce tension to the extent commonly supposed. For example:

- **78.5 per cent say they are not overworked.**
- **70 per cent never or only occasionally take work home with them, and 74 per cent put in less than five hours a week on home work.**
- **92.4 per cent say they generally have their weekends free.**
- **80.1 per cent average no more than two business luncheons a week, 89 per cent no more than one evening business date a week, and a slightly larger number no more than one weekend business date a month. Moreover, 79 per cent enjoy business luncheons, and almost as many like business entertaining.**
- **85.7 per cent say they have a feeling of security in their jobs; more than 90 per cent claim they are satisfied with the progress they are making and the recognition they are getting.**
- **98.9 per cent assert they can express themselves to their business associates, including and especially their superiors, "without fear." Only about 5 per cent felt that their superiors were stealing the glory while they did all the work.**

As for tranquilizers and sleeping pills, only 4.6 per cent of the entire group admitted using the former and only 3.3 per cent said they regularly used the latter. Answers also indicated that few drank more than moderately, and that fewer than 40 per cent smoked more than a pack of cigarettes a day.

The 13 per cent who did feel themselves under constant tension were vastly more dissatisfied with job and job security, business luncheons and business entertaining, more suspicious of associates, and more resentful of their bosses. They used more tranquilizers and sleep-inducing sedatives (though they slept less), smoked more, drank more cocktails at lunch and before dinner. They also had more personal problems with finances and family than the relaxed and happy majority.

"Tension," this report concludes, "is clearly identified with the personality of the individual executive and stems from within the man rather than from the outer forces of his environment."

Your Company's Secrets: Are They Safe?

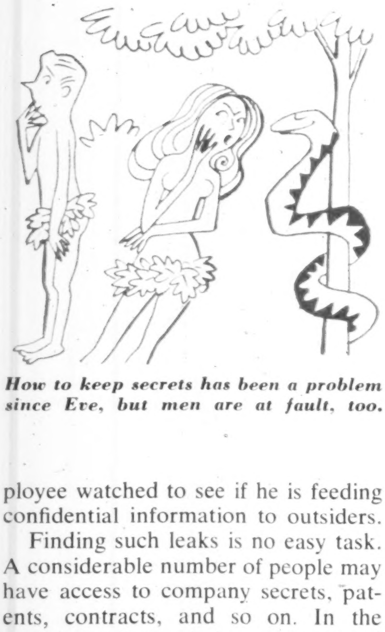
ALFRED G. LARKE, *Employer Relations Editor*

Vital company assets often depend upon management's ability to keep key data securely under wraps. Here's how companies spot and plug the "security leaks" that are a growing threat in industry today.

IF YOUR COMPANY has a secret—and what company hasn't?—hold on to it tight, tighter than you have in the past. According to at least one large detective agency, attempts to steal corporate secrets are growing, perhaps because of the current economic situation, or because of some recent well-publicized thefts and attempted thefts.

As a result, undercover operatives are being installed in increasing numbers to watch suspects—and anyone playing fast and loose with prized company data had best beware of that extra-efficient new secretary or that highly promotable new engineer.

The growth in corporate fear of theft, if not in actual theft, is attested to by Howard Winter, William J. Burns International Detective Agency manager in charge of industrial management control. Theft and diversion of company property increased with the recent decline in economic activity, according to Winter, and now there is a pick-up in the number of his clients who want some trusted employee watched to see if he is feeding confidential information to outsiders.



How to keep secrets has been a problem since Eve, but men are at fault, too.

Finding such leaks is no easy task. A considerable number of people may have access to company secrets, patents, contracts, and so on. In the notorious theft of thousands of oil exploration maps from Gulf Oil Corp. (for which two men were convicted on Federal charges a few months ago), the culprit was a 48-year-old company geologist with 25 years of apparently unexceptionable loyalty. He confessed taking maps variously valued, during the trial, at "more than $5,000," "$168,000," and "nearly $1 million."

In another oil exploration case in the Southwest, Pinkerton's National Detective Agency put in an operative who discovered a leak at the switchboard. A telephone operator was earning some handsome pin money by retailing information she overheard to dishonest outsiders. For them, this was a lot cheaper than doing their own oil exploration—until they were caught.

The variety of motives for such thefts adds to the difficulty of uncovering them. The switchboard operator was betraying her company for cash; the Gulf Oil geologist did it because of a fancied grievance against the company.

The kind of secret involved in oil maps is fairly unusual in American industry. More apt to be kept under wraps are such things as processes—especially the unpatentable or deliberately unpatented ones—future plans, sales volume, executive compensation, and the like. For, although business and industry in this country are celebrated for their free exchange of information in and through trade associations, government statistical bureaus, and such organizations as the American Management Association and the National Industrial Conference Board, they still clam up on a few subjects. These may be patents or processes considered unique to the company and vital to its profits. They may be new product or marketing plans, in which competitive surprise is essential. Others are "family" matters which might be embarrassing if bruited about, such as lush management pay or an executive's private style of living. "Good public relations" is the criterion here, along with plain, old-fashioned discretion.

If your product hasn't a little X99 in it, it's hardly worth carrying to market.

It started with Eve

How to keep a secret has been a major human problem ever since Eve, although in industry the men must take the blame. In any case, the best solution is simple—too simple: don't mention the secret, or mention it as little as possible. A Midwestern company, which makes special alloys for the aircraft industry, acknowledges that anyone can analyze its product, but hopes that no one stumbles on the process and formula by which it combines the ingredients. Meanwhile, it discourages even the mention of the fact that its alloys are compounded by a secret process—lest some rival try, not to "steal" the process, but simply to rediscover it through independent research.

Likewise the concern which decides to keep a process a trade secret rather than patent it usually fears the patent will be a target for others to circumvent by doing it just a little bit differently. Thus, Ace Electronics Associates, Inc., Somerville, Mass., keeps in a safe, rather than in the archives of the U.S. Patent Office, the blueprints and a model of a self-developed machine vital to one of its processes. The man who wants to copy it will have to be a burglar, not a patent-chiseler.

The unbuttoned lip

Some concerns run risks by talking too much or putting too much down on paper. A large trade association, for example, foolishly suggested in the prospectus of an economic education program for employees that the classes, to be given on company time, would consist of "captive audiences." Now, "captive audience" is one of the finest propaganda phrases you can hand a union. To hurt the program before it was even launched, all that was needed was for one union sympathizer in one office to pick out that phrase and pass it along to where it could do the most harm.

A classic example of a well-kept industrial secret is provided by the fish hook industry. There are said to be only three companies in the United States that make fish hooks, and how the barbs are put on the hooks is their secret. A company wishing to use a fish hook as a symbol in a training movie asked each of the three for permission to photograph the hooks as the barbs were put on. Two flatly refused. The third supplied a barrel of fish hooks and suggested a completely deceptive mock-up of an unreal assembly line, which only *appeared* to be part of the real operation. The movie makers had to be satisfied.

Studebaker once had to shift a road, chop down trees to discourage the "railbirds."

You can take it with you

Probably every age had its technological secrets. Willy Ley, the space travel expert, who sometimes dips into the past as well as the future, says that some sort of electric battery or crude plating process was known about 2,000 years ago in Mesopotamia. Not far from Bagdad an urn was found, in 1936, dating back to the Parthian Empire, which existed from about 250 B.C. to 224 B.C. In it was a hollow copper cylinder, topped by a plug of asphaltum in which an iron rod was imbedded. A General Electric engineer constructed a duplicate, used copper sulphate as an electrolyte, and created a weak current. His contraption was given to the Berkshire Museum.

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But the ancient Parthians, if they did discover galvanic current, or electroplating, or both, kept it such a secret that it was lost until Galvani in 1789 discovered or rediscovered the kind of current named after him and Volta made the "first" battery in 1800.

The ancients had trouble keeping secrets, too, though. The Biblical Hittites, believed to have been the first to smelt iron ore, exploited their discovery in war with great success but began to lose their battles when they lost the secret. In the same way, the Byzantine Greeks lost control of the

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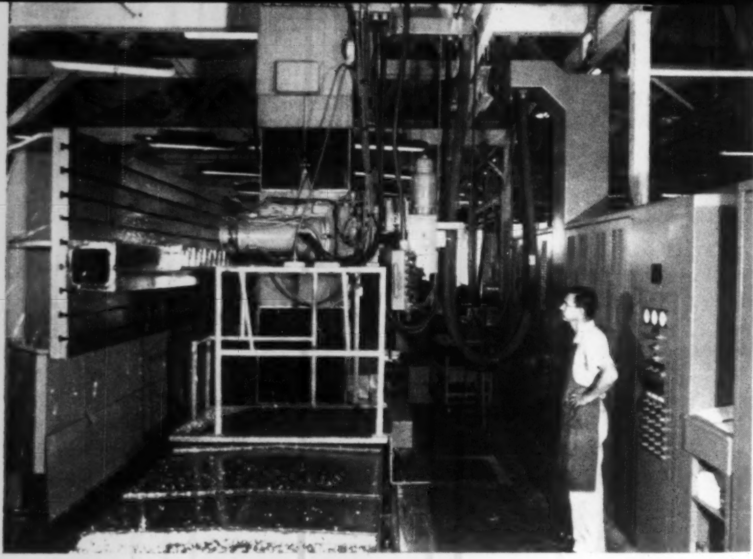

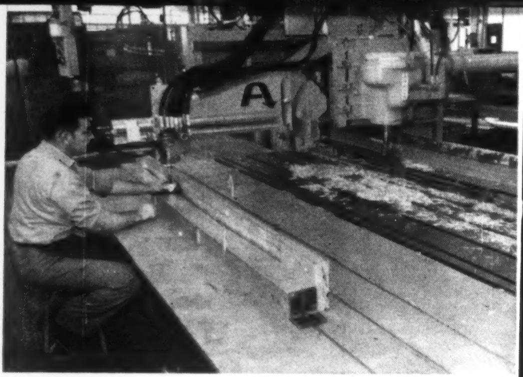

LOOK, NO HANDS: *At left, a giant Giddings & Lewis (Fond du Lac, Wis.) numerically controlled miller cuts a huge aircraft spar at Lockheed's Burbank, Calif., plant. Above: Numerical control goes far beyond the tracer-type millers, such as this manually controlled Arrow profiler at Convair (San Diego), which requires a costly metal template as big as the part.*

The Coming Revolution in Machine Tools

MELVIN MANDELL, *Industrial Editor*

A new species of machine tools that promises dramatic savings and increased flexibility for parts makers and their customers is already an industrial reality. Here are the facts on what it may mean to you.

ONE OF THE MOST impressive sights in American industry today is to see a line of big millers, under numerical control, carving parts out of metal at four or five times the rate of conventional general-purpose machine tools. Actually, they don't run that much faster than man-controlled machines, but in a given period of time, the numerically-controlled cutter is actually chewing away at the work piece about 85 per cent of the time, instead of the usual 20 to 25 per cent.

These advanced tools will be moving into the nation's metalworking job shops in a big way in 1960. By 1963, half the machine tools made in the United States may well be equipped with numerical controls.

The big mass-production plants will be among the leading beneficiaries. First, they'll use numerical control in their own model shops to turn drawing-board designs into prototypes quickly. Once prototypes are tested and approved, mass-production industries can expect their suppliers of dies, special-purpose tools and fixtures to save precious months of delivery time by means of numerical control.

All the other customers of the nation's metalworking shops will also benefit from faster delivery of capital goods. Instead of waiting six months for a new machine tool, customers may be able to take delivery in three. In turn, long-range forecasting on capital goods expenditures is bound to be affected.

Although today may seem to be a bit early to start worrying about numerical control, the plain fact is that executives in the metalworking industries already face the choice of learning fast about these high-production tools, or forfeiting an advantage to alert competitors. They can't afford to get caught without the necessary savvy for putting this complex technological innovation to work when the pressure of domestic and/or foreign competition, plus the need for greater productivity (we should be well into the next production boom by '60), forces them to buy. And it's not likely that there'll be enough experienced numerical control specialists available for the hiring when the need for know-how materializes.

Only the problems associated with buying the most advanced numerically controlled machines—the big millers that cut complicated shapes—will be considered here. Although plant management might find it easier to start with the simpler point-positioning controls (for drills, spot welders, riveters, punches and jig borers, see DR&MI, May 1956, page 43), and work up to the path-controlled machines, technology won't wait. The more advanced machines—advanced in the sense that they do things that point-positioned tools can't do—are already here. In fact, because of the urgent demand for new weapons, development of the more complicated machines started first—and more of them are already at work in the nation's factories. Once management can handle the big new milling machines, it's a snap to take in the comparatively inexpensive point-positioners, which do not require a computer.

Proof of the pudding

The many advantages of numerical control listed below and the examples of savings illustrated on this page make it clear why some of the smartest, most sophisticated production men in the aircraft industry are so excited about them.

- They bring big savings in cost—in make-ready, fixtures, cutting time, tool life, and scrap losses.
- Much less lead time is needed.
- You can get along with less inprocess and replacement part inventory.
- Because of higher accuracy the machines can cut closer to the minimum size specified for the part, with resulting weight savings, vital in aircraft.
- Tapes or punched cards take little storage space compared to equivalent templates for tracer control.
- Designers can attempt more complicated, advanced designs that would be impossible with conventional production methods.
- Numerical control is a natural for making parts with surfaces that can be mathematically defined, such as propellers, impellers, and radomes.
- Left-hand and right-hand parts can be cut at the same time from a single tape with a two-spindle machine, or successively on a single spindle.
- Numerical control provides high reproduceability.
- Surfaces are so smooth that further finishing may not be needed.
- The automatic machines will increase utilization of computers and Flexowriters—or offer additional justification for purchasing them.
- The machine takes little operator training, reducing dependence on the limited supply of highly skilled toolmakers. By stepping up the productivity of the worker, numerical control may also help to counteract competition from cheap foreign labor.

But, as of right now, numerically controlled machine tools have their disadvantages as well:

- The cost is high (although it's coming down steadily).
- They're not yet standardized. However, most of the control systems will work with most of the machine tools.
- The machinery is complicated.
- Tracer control is still superior where deflection of the workpiece or relieving of its internal stresses can't be predicted.
- It takes time and money to integrate the machine into a plant.
- Tool engineers and factory management must be retrained. Like high-speed computers and office management, the technology of numerical control has already progressed beyond the capability of most job shop managements to utilize it.
- A computer, or computer time, is needed. However, computer-equipped tape-preparation centers that work directly from blueprints are now springing up across the country.

There are significant differences among the various control systems now on the market and also among the three kinds of recording media —punched cards, punched tape and magnetic tape. But the first and most important problem to consider is whether and when to buy. By the time management decides to order a machine, even if the first step is taken in only six months, there may be important changes in the line-up of suppliers. Also, more data will soon be available on performance and all-important reliability. After all, the first machine has actually been in use for only about 18 months.

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Production Savings Through Numerical Control

Although these examples of cost savings and other advantages achieved through numerical control do not guarantee every user similar spectacular gains on every job, they do suggest the great potential of this new production tool.

Lockheed Aircraft Company, Burbank, Calif.

- A part which originally cost $69.50 is now machined for $15.50.
- Another part, which cost $40.35 to make, is now made for $14.30.
- Spar and skin mill cams, up to 12 feet in length, have been machined to accuracies from ±.0001 inch to ±.001 inch, where similar tools fabricated in the tool shop had averaged ±.005 inch tolerance.

Boeing Aircraft Company, Seattle

- Through the greater accuracy of numerical control, the weight of a wing skin panel now varies between 953.6 and 959 pounds. The same panel, machined by tracer methods, varies between 960 and 990 pounds, nearly 20 pounds.

Convair Aircraft Company, San Diego

- A missile support beam which formerly required over 12 hours machine time by tracer methods is now made in 73 minutes.

Northrop Aircraft Company, Los Angeles

- On a rib for the Snark missile, tooling time was reduced from 400 hours for tracer control to 151 hours for numerical control, and from 16.3 to 5.8 hours on machining.
- On a honeycomb die cavity for the T-88 jet trainer, total tooling and machining time was reduced from 550 hours for tracer control to 122 hours for numerical control. Lead time was reduced from 49 days to 3 days.

Boeing Aircraft Company, Wichita

- A 12-foot template which had taken 48 hours to make was made in 96 minutes with numerical control.

North American Aviation, Inc., Los Angeles

- Savings of $200 per hour in machine use were achieved, although the blueprints for the parts were not dimensioned for numerical control.

Martin Company, Baltimore

- In early months of use, rough machining time on a numerically controlled miller was reduced to one-fourth of that needed with conventional methods.

TRANSLATION: *After the process sheet is prepared from the blueprint by the parts planner, the ciphers must be converted to binary code on punched paper tape, as is being done here at Martin Company, Baltimore. The paper tape is then fed into a director, which translates data to punched plastic tape for Bendix control system.*

Many job-shop managers may wonder, reasonably enough, whether their present machine tools can be adapted for electronic control with some kind of numerical control kit. The question has a solid basis in fact, because some early demonstrations of numerical control were performed on refitted machines. Also, the Navy is actively studying "retrofit"—retroactive refitting of existing machines with numerical control.

Is "retrofit" possible?

However, most experts interviewed by DR&MI assert that retrofitting is practical only with the newest, most advanced tools. Considering the expense—from one-half to two-thirds of the original cost of a machine tool—it doesn't make sense on old or obsolescent machines. One of the most experienced production men on numerical control, Bernerd Gaiennie of Northrup Aviation, turns thumbs down on retrofit. Another expert points out that for not much more money, a company can buy a brand-new numerically controlled machine —which will make older machines more productive by generating templates and cams for them.

To be refitted, a machine must be shipped back to the tool builder and left there for six months. Friction and backlash must be reduced to an absolute minimum to insure accurate control.

As machine tool manufacturers learn to build equipment that takes full advantage of the capabilities of electronic controls, and as the controls themselves become more sophisticated, refitting will become increasingly impractical. Future numerically controlled machines will be so much more powerful, responsive, flexible, and accurate than conventional machines that it will become impossible to upgrade the latter to the new level of performance.

One of the most important considerations for a prospective purchaser of numerical control is where and how the tapes or punched cards will be prepared. Should they be made by the user or farmed out? Before getting into the "make or buy" problem, it's important to know how tapes or punched cards are prepared at present.

First, a planning engineer or a team of specialists must study the blueprint and decide how the job is to be handled—by a single cutter in one pass, by a single cutter making a roughing cut followed by a finish cut, or by removing most of the metal with a big roughing cutter, followed by finish cuts by one or more smaller tools. Then he has to decide on the paths to be followed by the cutting tools. In the future, as more performance information is gathered, machine manufacturers will supply elaborate instruction manuals to simplify the problem. Following the manual, two engineers or parts planners in different sections of the country would select practically the same cutters, paths, and machine speeds for the same part—and their selection would be the best for a given machine and job.

After selecting his cutter diameters and the path to be followed, the part planner prepares what is known variously as the manuscript, the planning sheet, or the process sheet. This plots, from point to point, the exact path and speed to be followed by the center of the tool.

Usually the preparation of the manuscript takes longer than any other single step in making a part by numerical control—sometimes weeks or months. (This, however, is usually a lot less than the time spent preparing a template for tracer control or a plaster model for a diemaker. Besides eliminating the need for modeling materials, there is no buildup of errors.)

Manuscript to tape

Next, the numerical information on the "manuscript" is converted from ciphers to a binary code punched into paper tape on a Flexowriter—a relatively simple operation (see photo on this page).

The latter two steps will in many cases ultimately be done by computer. Already the programs for machining have been worked out for an IBM 704. Eventually, programs will be prepared for other makes of computers, both large and small.

In two of the present numerical control systems, a comparatively slow-speed computer called a "director" is part of the electronic controls associated with each machine tool. The punched paper tape (or punched cards) is fed right into the director, which then converts the punched-out binary code into the proper electrical signals for the machine. Various characteristics of the tool are previously memorized by the director to aid in interpolating the punched paper tape or cards.

In the majority of systems, however, the director is not on the factory floor with the controls. In these systems, the director translates the instructions on the paper tape on to a

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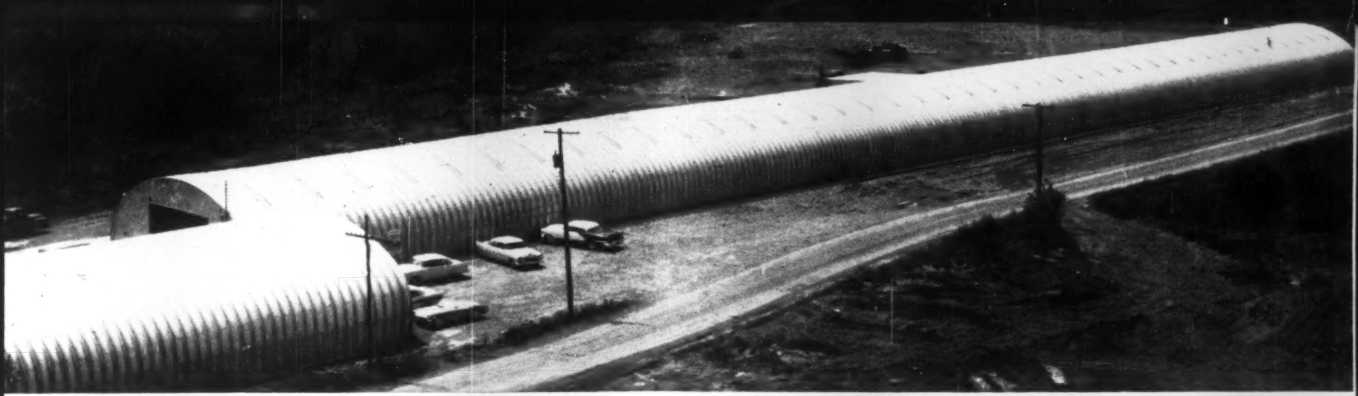

500 feet long and 48 feet wide, this building was made entirely of deeply formed 18-gage USS Galvanized Steel Sheets.

Need a strong building in a hurry?

This building could be extended lengthwise coast to coast and it wouldn't need one pillar for support. It has all the structural strength it will ever need right in the USS Galvanized Steel Sheet walls. It wouldn't take long to build it either, because the corrugated steel arches are pre-formed and easy to bolt together. 500 lineal feet of this building was erected by six unskilled men in only 17 working days!

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IBM MANAGEMENT INTERVIEW

J. C. Fisher, Robert M. Wagner, James R. Bolton—the men who led the electronics program at Buick.

GOLDEN MILESTONE GENERAL MOTORS

HOW IBM HELPS BUICK BUILD BETTER CARS

An exciting new tool in the auto industry's continuing efforts to build even better cars is the IBM 705 electronic data processing system. From complex production scheduling to the design of new transmissions, the IBM 705 is helping to bring a startling revolution to the auto industry.

As exciting as any story is that told by the Buick Division of General Motors. Here, reporting on Buick's progress is the management team that spearheaded the IBM 705 program. Led by General Manager and GM Vice President Edward T. Ragsdale, they are: Robert M. Wagner, General Production Manager, James R. Bolton, Comptroller, J. C. Fisher, Superintendent of Data Processing.

Q. **What is the IBM 705 doing for you?**

A. The biggest thing right now is helping us keep our production of parts and sub-assemblies keyed to a constantly changing public demand . . . so we can ship a Buick exactly the way the customer wants it, in the shortest possible time.

Q. **What's involved in this?**

A. It means controlling the flow of production from 2000 different suppliers who furnish us with some 3500 different parts and assemblies, ranging from bolts to complete bodies.

Q. **How is the IBM 705 improving your handling of this flow of materials?**

A. When a sales trend was spotted that made a change in our schedules necessary, it used to take two weeks to make the change—that is, to do all the paperwork and computing. And that's with plenty of overtime. Today the IBM 705 does all this work, including printing new contracts for mailing, in *seven hours.*

Q. **Do you gain other benefits from your IBM operation?**

A. Oh, we're using the machines in many areas of our business. We get our parts sales analysis reports ten days sooner; we get operating reports on a daily basis that were never possible before. And, as I've mentioned, our engineers are even building better Buicks with this IBM 705 computer.

Q. **What's the advantage of using a computer in the design stages?**

A. It helps us cut down on the expensive procedure of actually building premature prototypes to test a new

design. The IBM 705 can figure performance or design characteristics mathematically... to save both time and money.

Q. Well, how does the IBM 705 do this?

A. Our "car performance prediction" procedure is one of the most interesting examples. There, the IBM 705 puts mathematics to work to ascertain what a new engine or transmission will deliver in a new automobile under all expected operating conditions. A testing procedure like this normally takes hundreds of thousands of dollars and months of engineering work. The IBM 705 takes about one-half hour to come up with a complete performance report.

Q. Aren't these problems a man could solve if the time were available?

A. Of course, but what the system does in minutes would take a man months or years. Recently, the IBM 705 handled in a minute-and-a-half a job that once took a week-and-a-half. The mathematics involved in producing the car performance reports we spoke of would take an engineer decades to calculate, if he chose to do it without the aid of electronics.

Q. Then, actually you're doing things that were once entirely impossible.

A. Realistically speaking, yes. An engineer used to start with the first design that met his requirements. Today, we're running off the many possibilities of a design so that he can pick the most effective *in advance*. We've gone far . . . but we've only begun to realize the possibilities of electronic data processing.

IBM DATA PROCESSING

INTERNATIONAL BUSINESS MACHINES CORPORATION
590 MADISON AVENUE, NEW YORK 22, NEW YORK

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–Edward T. Ragsdale,
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General Motors Corporation
General Manager,
Buick Division

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you can make is in
the creative ability of men.

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GOOD WILL AT WORK: *Marvels of modern production may be the main attraction here, but the Pepsi-Cola trademark is sure to make a lasting impression on Iranians like these, who are watching the bottling process at Pepsi's new Teheran plant.*

Guard Your Industrial Property Rights Abroad

ALEXANDER O. STANLEY

Even if you're not selling overseas today, it may pay you handsomely to safeguard your trademark in foreign markets. And you can do so at a fraction of what it might cost you later to ransom a "pirated" mark.

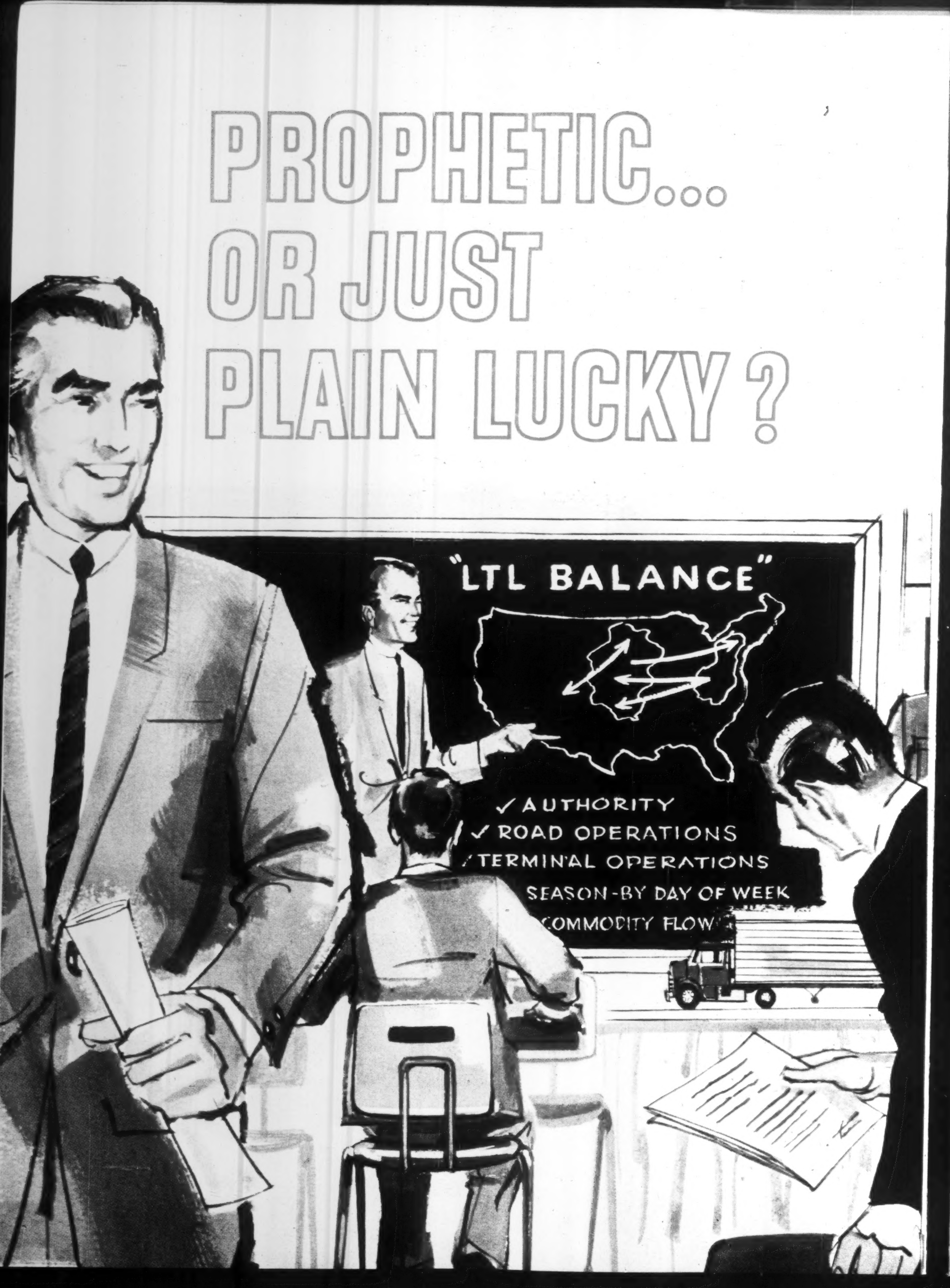
TO DEVELOP CONSUMER recognition of its new products or services and to offset attrition by competitive brands, American business has followed the practice of creating an inventory of trademarks. In 1957 alone, 17,234 new trademarks were registered in the U.S. Patent Office, and new applications continue to flow by the thousands.

This massive effort to develop and protect industrial property rights extends to the patents, the formulas, the designs, and the know-how that represent a major capital asset of almost every manufacturer. All these ingredients of "good will" involve tremendous investments, and since they secure company and product identification, they obviously require legal protection. But while American management has guarded its industrial property rights jealously within domestic channels, it has been somewhat short-sighted where overseas protection is concerned, particularly in the area of trademarks and know-how.

The casual approach may have been justifiable in the past, when our international trade and investments abroad were small. But in the increased tempo of foreign trade since World War II, the expansion of international programs by an increasing number of U.S. companies, and the growing pressures within marginal overseas markets to upgrade their economies by promoting industrialization, suggest the need for high priority in protecting U.S. industrial property rights.

The hazards of doing business abroad have different dimensions for different companies. But today the risks and trials are only compounded by a piecemeal approach to the problem. Why not reverse the procedure and first analyze the markets from the standpoint of methods required to insure trademark control? When a company buys insurance, it wants and expects comprehen-

PROPHETIC… OR JUST PLAIN LUCKY?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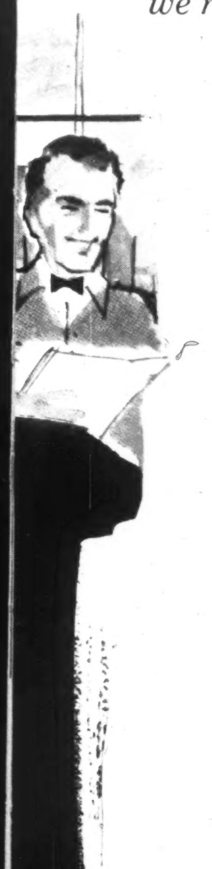
SPECTOR MID-STATES

THINGS HAVE A FUNNY WAY of working out for some people. Take us for example. When we merged a bit over a year ago, we had a feeling that we should get to know more—lots more—about the handling of small shipments *in a balanced operation*. Sure, any carrier knows that handling LTL on a balanced basis is the only way to come out with a profit at the end of the year. But more important, we asked ourselves, wasn't balance important to The Man At the Top of Our Organization Chart—Our Customer? Didn't he benefit when our trailers ran to capacity *both ways?* . . . when our terminal people could plan a consistent workforce? Certainly, he did!

So we set out to know more about operating a balanced truckline. We sent our people to school—even Stan, our president. We held classes at our terminals, on our docks. So, today—what turns out to be the most pressing distribution need of industry in all 48 states—efficient small shipment service. And here we are—just one year after our merger—schooled, trained and graduated. "Proficient in all subjects related to the transportation of small shipments . . . " our diploma reads.

Prophetic? Lucky?



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sive coverage. It's only logical to apply the same requirements to industrial property protection. Accept the fact that you cannot predict risks—and must therefore protect yourself on a global basis. Today's thin market can suddenly become a prize area. Trademark pirates are quick to hear of impending changes and can beat you to the punch in establishing prior rights to a trademark in which you have made a heavy investment.

No safety in obscurity

The risk of identification snatching is not limited to blue-chip names. Any "made in USA" product is susceptible. Even if you do not export, your products are quite likely to be known abroad, since some "domestic" sales are actually for export consumption. And that is only part of the risk exposure. The domestic consumer and trade publications in which you advertise often find their way overseas where they are carefully scanned by trademark entrepreneurs willing to risk the registration fees on the off chance that someday you will want to "go international" and have to pay them off.

Some companies have assumed that domestic safeguards, based on the prior use of specific trademarks, provided umbrella-like coverage throughout the world. In reality, to obtain protection, actual registration of trademarks is required by local law in almost all overseas marketing areas.

Other concerns, in anticipation of future marketing operations, have developed skeleton programs for industrial property protection abroad, only to find eventually that they picked the wrong market.

The danger is especially great in areas that are isolated today but may be part of common market combines tomorrow. Blanket registration of industrial property rights is worth what it costs.

Though the volume of regulations and exceptions in the 76 key foreign markets we trade with actively is too lengthy to consider here, and though the technicalities of protecting industrial property rights abroad must be left to your lawyer or legal department, the facts that follow will highlight some of the practical problems involved.

- Trademarks (symbols or words) are of more consequence in overseas markets than trade names (name of company). Company names that are well known domestically may be unknown in many areas abroad. Therefore, the safest way to maintain good will with overseas customers is to build your market around your registered trademark.
- Prior registration of a trademark in the United States is *usually* not required to qualify for registration abroad. Companies, therefore, can usually establish and protect new trademarks abroad while applications are pending domestically.
- There is no protection for unregistered trademarks abroad. In most countries legal action against trademark infringement can be taken only when registered trademarks are involved. There are, of course, remedies under various forms of unfair competition statutes but these are complex and difficult to apply.

Dollar costs

- The costs of registering trademarks vary from one country to the next. Usually, the smaller the country, the larger the fee. But the charges will average roughly $100 per trademark. The "insurance" period on the average runs anywhere from ten to twenty years, reducing the "premium" to an annual average of $5 to $10 per mark. In some cases, the cost can be further reduced by covering several classifications or paying a small additional fee for covering more than one class.
- The mechanics of registration are best left to company counsel. There are, of course, U.S. and overseas specialists who control procedures through attorneys situated in individual overseas markets.
- While trademark terminal dates vary from one country to another, registration usually affords protection from ten to twenty years. In Latin America and Europe, half the countries fix the expiration date at ten years, while the remainder observe fifteen- and twenty-year periods. Countries in the Middle East, Africa, and the Far East tend more toward the fifteen-to-twenty-year period.
- Most countries provide renewal privileges. Some even allow a grace period after expiration for subsequent filing, at some additional cost.
- Once a mark has been registered, it must be used and policed.
- Policing trademarks globally is less complicated than it seems. Company counsel can easily arrange to scan the official publications of each country in which all new trademark applications must be published. Of course, legal departments must be prepared to defend company property against any infringements. Walter E. Hopper, Jr., chairman of the International Committee of the

U.S. Trademark Association, estimates that, on the average, any concern with far-flung operations may have to contend yearly with several hundred infringements.

- Be on the lookout for infringement by companies using similar or equivalent trademarks for non-competitive products. Shoddy merchandise, of a completely different character from the original trademarked product, has been produced under well-known trade names to get a free ride.

Keeping a claim alive

- If trade restrictions or exchange regulations prevent shipping goods into a specific area, thus necessitating a temporary abandonment of the market and the trademark, you can often keep your claim to the mark alive by token shipments. If that is not possible, a strong case may be made by pleading inability to use trademarks because of "special circumstances in the trade." This will suffice in some cases. Moreover, proof of abandonment rests on the company seeking to take away the trademark.
- Some countries require that registration of your trademark be indicated on the product. Since markings differ by markets, leave room for this identification on trademark facsimiles, labels, and name plates.
- If possible, marks should not be cast or stamped on products for exports. If modifications or alterations are anticipated, due to local market conditions, nameplates or decalcomanias are more suitable to carry identification. They are more flexible and can be adapted to differences in language, trade styles, and other necessary markings. Also, if exporting to areas with a low literacy rate, symbols may be emphasized for quick product identification. Finally, in some areas, certain colors may have unfavorable connotations. Before taking a trademark to market, be sure to have it analyzed for these factors.
- Language differences can also raise certain problems. A trademark name may become known by the foreign language equivalent. Such translations should be made immediately to avoid future difficulties with trademarked products of local origin. If the local equivalent is already spoken for, it's better to face the problem early. At best, you can negotiate without pressure for purchase of the name. At worst, you can create or coin an adequate substitute and build product identification around it. This is especially true in the drug and pharmaceutical field, where translation often

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makes the name or mark more pronounceable and avoids negative reactions.

- Selling or assigning trademarks is possible, but the rights that must be transferred vary from country to country. In some cases the active business or good will developed within the particular country must be transferred; in others, only that part of the business and good will engendered by the specific trademark. Investigate before you negotiate.
- Much more freedom exists in licensing trademarks, since most legislation contains no permissive or prohibitive reference to trademark use in licensing arrangements. But clear this point with counsel before negotiating the contract.

Safeguarding know-how

- In developing license agreements, patent and technical know-how control should be separated from the document that conveys the right to the trademark. Aside from the obvious practical aspects of such a separation, trademark grants to licensees become public documents in many countries. Registration of technical agreements as a package with the trademark exposes them to competitors. It also weakens the control of the U.S. licensor over industrial processes if a change of licensee becomes necessary.
- Trademarks applied to goods manufactured abroad by licensees should be guarded by quality controls. In any event, all registration legalities should be tightly and wholly controlled by the licensor. Today's licensee may be a competitor tomorrow. Some companies have adopted modifications, or created dual trademarks suggesting the original design, to emphasize that the product is locally produced without sacrificing product identification.
- A trademark can be so successful—like "aspirin" and "cellophane"—that it becomes a generic term in the public mind. Constant company identification with trademark and trade names through advertising and public relations—and constant policing—are a "must" to preserve product identification. Conversely, continuing efforts are made by manufacturers in some countries to register generic names, such as "phonograph" or "penicillin," as protected trademarks. And only recently, newspaper accounts dolefully reported that foreign visitors to the Brussels Fair were unable to view U.S. popcorn machines in action, because the word "popcorn" is a registered trade name (owned by a Belgian national). And the French are currently planning to prohibit the use of French regional names to describe alien wines and cheese—e.g., Burgundy and Roquefort.

Increasing attention is being given to the problem of protecting industrial property rights overseas. At its 81st Annual Meeting this April, the U.S. Trademark Association devoted a sizable part of its agenda to the problem.

Another interested organization is the U.S. Council of the International Chamber of Commerce, which has a standing committee working with various organizations, including its overseas chapters, to survey and assess new industrial property legislation in member countries. It also participates in conferences dealing specifically with this problem.

Two-pronged approach

Under the chairmanship of Dr. Stephen Ladas, one of the leading authorities in trademark matters (and a member of the New York and Chicago firm of Langner, Parry, Card & Langner, specialists in foreign patents and trademarks), the International Chamber of Commerce is currently involved in two pertinent programs. First is the upcoming Lisbon Conference for the revision of the International Convention for the Protection of Industrial Property. Secondly, the I. C. of C. is sponsoring efforts of U.S. firms to develop an international system for the protection of know-how. As more American companies transplant assembly lines overseas or write licensing agreements to produce Brand X as a home product in single or merged common markets, the problem of protection increases. In the words of Dr. Ladas:

> There are two kinds of know-how, tangible and intangible. The tangible would include such things as drawings, designs, lists of materials needed in manufacture, lists of documents on processes, and so on, relevant to manufacture. Intangible know-how might include demonstrations, procedures, oral instructions to foremen, and so on.
>
> A big question is whether know-how should be considered a property right or a contract right. If it is a property right, then if a licensee reveals it to a third party who does not know of the restrictions on it, the original owner can still make a claim against the third party. If it is a contract right, then it must be proved that the third party knew of the restrictions. Furthermore, if it is a property right, capital gains are possible. If a contract right, profit would be considered income only. In the United States it is treated as a property right. This is a frontier area in law, and it is important to obtain international agreement before conflicting precedents have been set.

In American procedures, provisions are usually included in a licensing agreement to the effect that know-how is the property of the licensor. The licensee agrees not to divulge it. It is also usually stated that the know-how is to be returned at the end of the agreement. This is a "pious expression," since once know-how is disclosed, little can be retrieved. However, the following factors offset this liability:

1. The American manufacturer seeks to make contracts long enough so that the loss of know-how is paid for.
2. Technology is often fluid, so that the manufacturer expects know-how to become obsolete anyway.
3. To keep the licensee bound, the know-how is often transmitted on a continuous basis. The prospect of future improvements makes the licensee reluctant to break away.

Illustrating the broad points at issue are these examples:

Case No. 1: An American company contemplated an agreement with a South American firm. Before the agreement had been concluded, a U.S. team was sent to South America. They provided a list of documents and instructed local technicians. The agreement fell through and the U.S. company wired its representatives to burn the documents. However, the intangible know-how was lost and recovery was impossible.

In this connection, Dr. Ladas points out that a technique might not be secret and yet be classified as know-how if it is not known to the foreign manufacturer. This consideration raises the problem of an exclusive agreement.

Case No. 2: Most court cases on know-how have centered on the question of whether the licensee is still obligated to pay royalties after know-how becomes public. A German decision held that once know-how is widely known, the original owner cannot prevent communication of it by injunction. It did not say whether the royalty must still be paid and the issue was settled out of court. This happens often as a consequence of legal uncertainties and the common desire to continue otherwise profitable arrangements.

Case No. 3: In Sweden, a case came up where a textile manufacturer had concluded a know-how agreement. The know-how became public through the activities of a Swiss chemical manufacturer. The Swedes challenged the right of a licensor to collect royalties, but finally agreed to pay all royalties due and to continue paying for five years.

The laws and conventions governing industrial property protection are necessarily elaborate, for the problems themselves are complex. They are under constant scrutiny and subject to constant revision. Remember, however, that they are for your protection. Be informed and you will insure yourself against an important hazard. END

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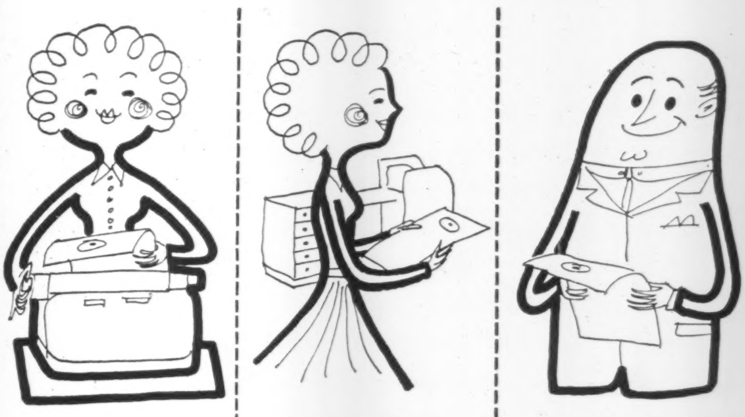

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Across town you'll see other Janesville folks turning out almost a thousand fast-selling Chevrolets a day in the General Motors plant. As GM Vice-President Edward N. Cole says: "Good people, of course, can make all the difference in the world between just satisfactory products and really superior ones. We are proud of the stability of employment and the excellent caliber of employees in Janesville's Chevrolet and Fisher Body plants — things which are reflected in the superior workmanship on the Chevrolet products manufactured here."

What No. 1-quality people have done for Parker Pen and GM in Janesville they can do for "thou" — anywhere in Wisconsin. Because, throughout Wisconsin, people are making a difference — in products . . . and in profits.

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EXECUTIVE BOOKSHELF

Brief Reviews of New Business Books

How to Manage Managers

MANAGERIAL PSYCHOLOGY *by Harold J. Leavitt. University of Chicago Press, 5750 Ellis Ave., Chicago 37, 335 pages, $5.*

A useful and sensible analysis of human problems within supervisory and management ranks, ranging from individual behavior and the psychology of committees and small groups, to problems unique to large organizations.

The Listless Crowd

THE WORKER VIEWS HIS UNION *by Joel Seidman, Jack London, Bernard Karsh, and Daisy L. Tagliacozzo. University of Chicago Press, 5750 Ellis Ave., Chicago 37, 300 pages, $5.75.*

A provocative account of rank-and-file attitudes that goes far toward explaining the curious blend of loyalty and lethargy typical of most union memberships.

Ounce of Prevention

INTEGRATED COST CONTROL IN THE OFFICE *by Frank M. Knox, McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, 293 pages, $7.50.*

A specialist in forms control, Mr. Knox offers a timely, practical guide to reducing and controlling office costs by streamlining paperwork, eliminating unnecessary clerical operations, increasing management responsibility, and making economical use of modern equipment.

Of Time and the Business Man

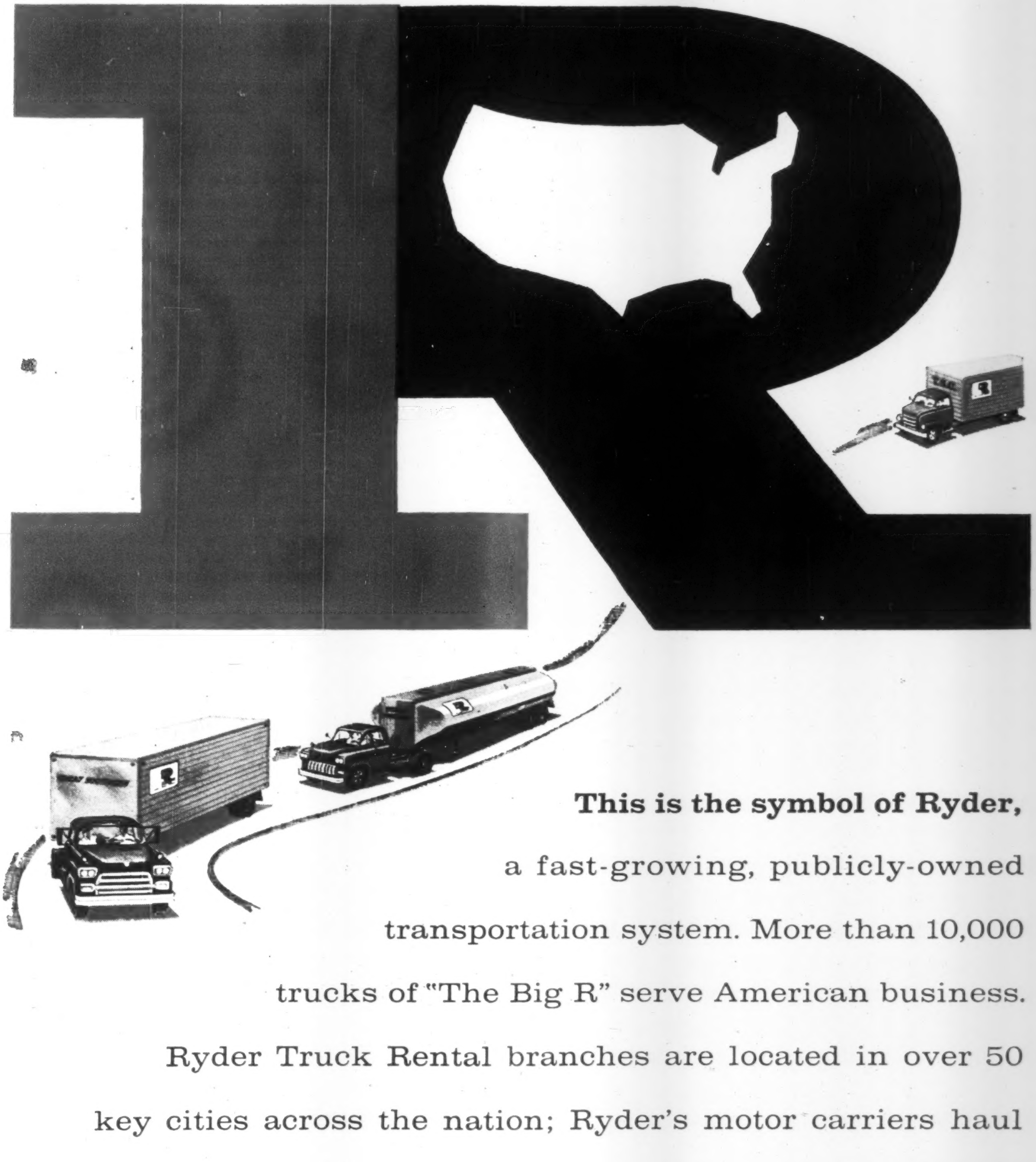
ALL THE TIME YOU NEED *by Robert P. Updegraff. Prentice-Hall, Inc., Englewood Cliffs, N.J., 312 pages, $4.95.*

Almost any executive is bound to find a useful trick or two in this semi-inspirational compendium of ideas for planning and utilizing time.

Facts and Figures

TARGETING SALES EFFORT *by Charles W. Smith. Columbia University Press, 2960 Broadway, New York 27, 396 pages, $15.*

Marketers of nationally distributed products will be interested in this geographic sales analysis, which breaks down all U.S. "trading centers" by population, number of retail establishments, and volume of retail sales.

**This is the symbol of Ryder,** a fast-growing, publicly-owned transportation system. More than 10,000 trucks of "The Big R" serve American business. Ryder Truck Rental branches are located in over 50 key cities across the nation; Ryder's motor carriers haul freight or bulk liquids in 20 states from New England to Texas.

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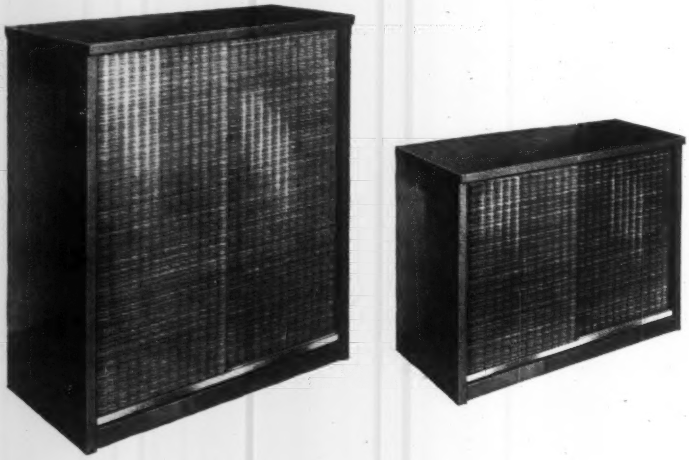
BORROUGHS

"Borite" sliding-door cabinets



Pictured above are two photographs of Borroughs "Borite" sliding-door cabinets. They are truly beautiful in their modern colors. You have your choice of two heights, 29 and 42 inches, in depths of 12 and 18 inches. The outside width of all cabinets is 36 inches. You'll find more of the details below.

"BORITE" is an unbreakable composition of plastic and fiber glass, available in four beautiful colors — Beige, Aqua Glo, Pinktone, Citron Yellow. Here's an idea . . . the next time you visit your office equipment dealer, ask him to show you the Borroughs line of cabinets. Whether you choose one in Spring Green, Dark Green, Gray or Fall Tan, you'll find a "Borite" door to harmonize with it perfectly . . . one that will make your office more cheerful and colorful . . . and no doubt you'll buy several while you're at it. Borroughs was first with "Borite" sliding doors . . . and Borroughs is also first in value. Compare, and you'll see!

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YOUR COMPANY'S SECRETS

continued from page 45

secret of "Greek fire," a wonderfully handy weapon in naval battles, which may have been sulphur or even an early form of gunpowder.

How to market a mystery

The value of many modern-day business secrets lies more in the existence of a mystery than in what it actually conceals. Thus, the fact that Smith Bros. cough drops have a secret formula may be of more value than the actual formula itself. The marketing value of a secret ingredient is amply illustrated by the wild assortment of initialled and numbered "secret" ingredients advertised in everything from toothpaste, soap, and breakfast foods to gasoline and cosmetics. If your product hasn't got a little X99 in it, it's scarcely worth carrying to market these days.

Most fabulous of the secret ingredients has no name, however, not even a set of initials or numbers. According to legend, it's the seventh of seven ingredients that go into Coca-Cola, known only to two chemists who are not permitted to travel together, lest both should be killed simultaneously. Not even the president of the company knows the formula, which is kept in a doubly-guarded vault, just in case. Sugar syrup, caramel, phosphoric acid, vanilla, a little caffeine, an extract from coca leaves and cola nuts, and what a writer from *Reader's Digest* once tried to label "7X"—this formula, plus a tremendous marketing program, has helped Coca-Cola to outlast 4,000 rival beverages over a period of 72 years and give the other survivors more than a run for their money.

Another product which owes much of its success to a secret formula is Angostura Bitters, a proprietary mixture that goes into Manhattan cocktails—at least, if you ask for it. Here the flavor of a very small amount—a drop or two—is what sells or fails to sell the product. The Angostura flavor, which is said to be derived from a secret South American herb, is the sole salesman for the little bitters bottles. The loss of this distinctive flavor to a competitor might be very serious for the owners of the Angostura formula.

More ephemeral than a flavor, but just as important to many a company, are its new product designs or new marketing plans. Most business men remember the incident last year when *The Wall Street Journal* disclosed details of forthcoming new automobile designs—and lost its General Motors advertising for a while.

In this case GM was probably more distressed by the advance notice given to the public than at any revelation to competitors. The leakage rate is tradi-

NEW from Standard Oil

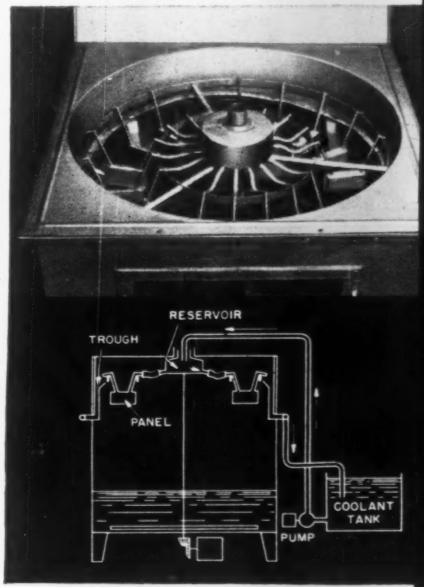
THE MAGIC BOX

Corrosion steals $5.5 billion from industry annually. Standard Oil is in the forefront of the fight to control this loss. Standard's research scientists have developed a new method for measuring the effectiveness of rust preventives. This new test takes less than one-twentieth of the time of previous tests—and is about three times as precise.

Using a controlled humidity cabinet for testing corrosion, these Standard research men installed a system for cooling metal test panels (previously treated with rust preventive) so that their surface temperatures are lower than the temperature in the cabinet. Temperatures of panel surfaces and of cabinet atmosphere are held accurately. Controlling the temperature of the panels controls the rate at which water condenses on them. This in turn (for the first time) permits accurate control of the amount of condensation on the panels. Rust preventives are more speedily and precisely tested. Science, as a result of this work, has a new tool with which to test corrosion.

This is the research pay-out industry receives from Standard Oil. This is the something extra that backs up the Standard industrial lubrication specialist who calls on you. This is the something extra found in the products he sells.

To know more about how Standard Oil industrial lubrication specialists—and Standard's research program—can help you, call the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.**



Top view and cross section of Accelerated Condensation Corrosion Test cabinet.

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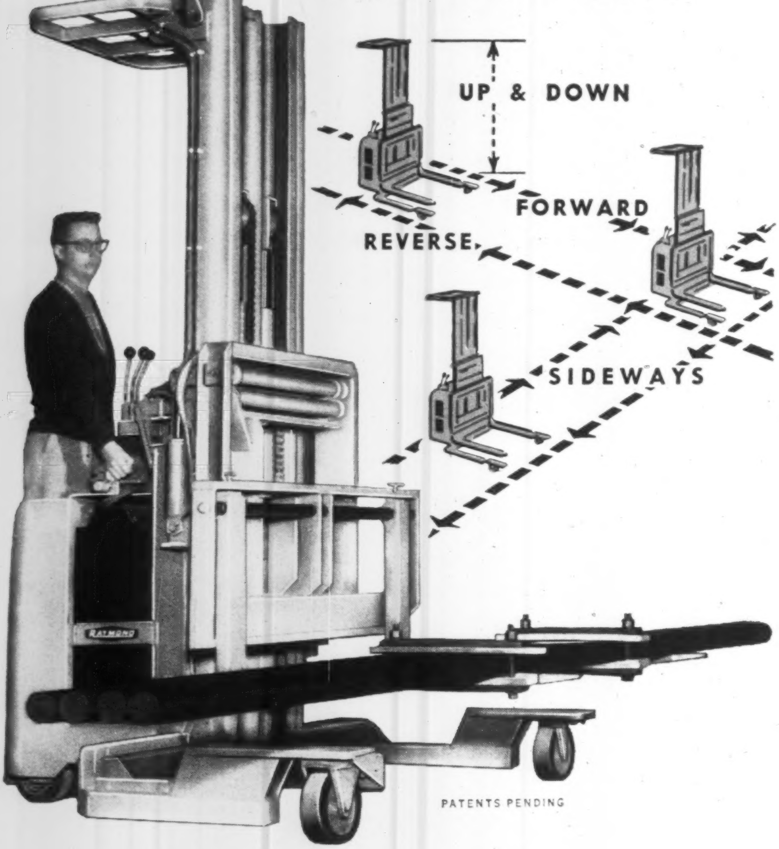
Edgar A. Dieman, Standard Oil scientist, inventor of new Rust Preventive System, inspects metal panel that has undergone test in the humidity cabinet.



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tionally high in and around Detroit, and most people in the auto industry are aware of their competitors' plans long before the curtains are pulled back at the auto shows.

One-upmanship

Much passing of information is simply due to the human desire to appear knowledgeable and the equally human desire to truckle to one's boss or best customer. Driveaway truck drivers, taking test models to testing fields, are apt to swap peeks at rival cars, or at least pick up some information about them. If Driver A picks up something about Car B, he can curry favor with his boss by passing it along, and so on up the hierarchy. (Of course, Driver A swapped some information about his Car A to Driver B—in order to make it a fair exchange.)

Similarly, the simple desire to show off with "inside dope" may make a small-machine-tool designer reveal his part in preparing the 1960 Panther 12.

But more direct methods are used, too. Studebaker Corp. once had to shift a road, chop down some perching trees, and plant others to keep "rail birds" from spying on its test-model trials at a track near its plant.

Hiring vs. wiring

One common method of "finding out" about the competition is by hiring away its personnel. A competitor of a Long Island, N.Y., zipper concern, got secret information simply by hiring away a foreman with the offer of better pay. Less common, and certainly more offensive, is the practice of literally listening-in. Three years ago, as yet undisclosed parties tapped the wires of the president of E.R. Squibb & Sons, apparently to try to get a jump on any new drugs that company might be planning to market in this highly competitive era of "wonder" drugs. The same year an official of Chas. Pfizer & Co., Inc., told of paying $60,000 to a wiretap expert for a "security check on employees because some chemical formulas had been leaking out to competitors." Revlon, Inc., likewise found its phones tapped and its offices "bugged," and not by people looking for the answer to "The $64,000 Question."

Dissimilar in nature, but likely to be closely guarded as any other secret, is a company's strike manual—its guide for conduct in time of strife, compiled in time of peace. It's good sense to keep such plans quiet—and not just for self-protection in case a strike does come. The very knowledge that such a manual exists may lead to ill feeling between employer and labor group.

The jealous guarding of another type of data—sales and breakdowns of profit figures—is so nearly universal that it

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RESOURCES	
Cash on Hand and in Banks	$ 288,309,043.78
U. S. Government Obligations	483,743,804.52
State, County and Municipal Bonds	92,000,327.76
Other Bonds and Securities	30,601,473.19
Stock in Federal Reserve Bank	2,400,000.00
Loans and Discounts	832,430,613.42
Bank Premises and Equipment	17,711,560.76
Other Real Estate	1.00
Customers' Liability under Acceptances	1,257,111.69
Accrued Interest Receivable and Other Assets	14,825,231.36
Total Resources	$1,763,279,167.48

LIABILITIES		
Deposits		$1,617,490,234.91
Acceptances Outstanding		1,335,633.83
Reserve for Unearned Discount		14,515,827.92
Reserve for Interest, Taxes, etc.		13,055,816.58
Other Liabilities		3,663,070.54
Capital Funds:		
Capital Stock ($10.00 par value)	$27,812,500.00	
Surplus	52,187,500.00	
Undivided Profits	33,218,583.70	113,218,583.70
Total Liabilities		$1,763,279,167.48

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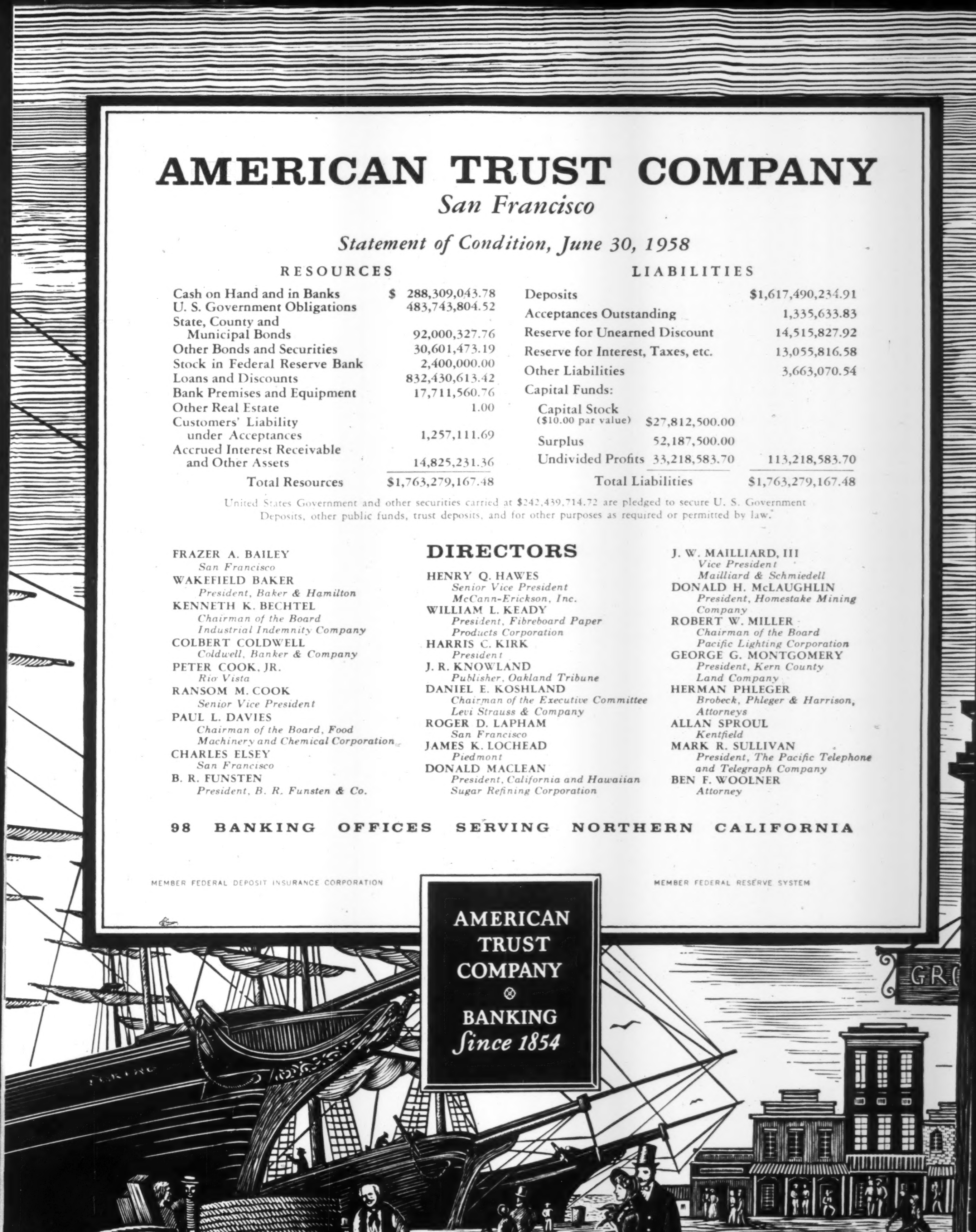

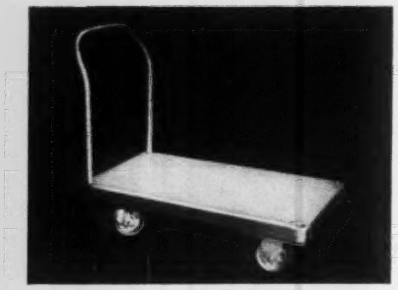

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scarcely needs mentioning. Nevertheless such data are often given freely to statistics-collecting agencies. According to a divisional director of a large private research institution, corporate officials disclose such information as readily to government bodies as they do to his organization—except when it appears that material is being gathered for legislation.

On the other hand, says this research man, industry is often reluctant to talk about executive compensation, although the facts and figures are usually available from government records.

Though American corporations are exceptionally free with many kinds of information, they often button up on things that are easy to find out elsewhere. One executive advises guarding sales statistics carefully, yet confesses to a pretty good idea of competitors' sales, even though they submit figures only to trustworthy common data-collecting agencies.

If your sales are up or down substantially, he contends, it is not hard to figure out who has lost to you or gained from you. In the first place, any substantial shifts are likely to be limited to a handful of rivals. In the second place, salesmen's reports, information from wholesalers and distributors, and a little sampling work may give more than an adequate hint of who is getting how much of your market. There are even commercial services that supply such data. Chrysler, before its current sales upturn, didn't have to hire spies to find out who was getting its lost business.

To the trade only

Still, production and sales volume are top secrets. Some trade associations, like the National Electrical Manufacturers Association, run a statistical department that is guarded almost as closely as a State Department code room. The NEMA figures are collected and collated on a separate floor. A small reception room stops most people. Beyond is a door with an electrically operated lock —and even members do not get past that.

Locks and barricades are one good way of protecting any secret, of course. Pharmaceutical houses have wire and wood fence enclosures and pass systems to protect processes and research that will provide future profits. A Midwest manufacturer of components for electric ranges has a sealed room in the middle of an assembly operation—the line runs through it and only authorized personnel can enter.

E.I. du Pont de Nemours & Company considers the whole process of making nylon confidential, and some of the steps it takes to keep it so are a good indication of normal methods of safeguarding a process secret. For instance, employees involved with confidential technical information sign an agreement not to disclose such knowledge improperly.

Much of the equipment used in manufacturing nylon has been built to company specifications. Some critical pieces are built by the company itself to maintain secrecy. When the company uses outside vendors, they must agree, as do employees, not to disclose "confidential" information to others. Du Pont even classifies as confidential the use of nonspecialized equipment when used in the nylon operation.

Further precautions are taken to prevent leakage to suppliers, customers, or members of technical associations. Material for publication, such as technical papers, advertising, company literature, and publicity releases, is carefully screened for inadvertent disclosure. Even so, some confidential data leak out now and then for lack of vigilance or someone's failure to realize the significance of a bit of information. The task is not made easier by the fact that the process is licensed outside Du Pont.

These methods are akin to precautions taken in plants turning out top-secret defense products, and a good guide to such protection may be found in a series of security reports put out by the National Industrial Conference Board in recent years.

At least two other means of protection suggest themselves. One is a good lawyer to draw up iron-clad employment contracts guaranteeing that knowledgeable personnel cannot quit and sell their knowledge without a stiff penalty. Another is a good protection service, such as a detective agency, if the situation warrants it.

Don't hide the obvious

Last—and most important—it is well to consider what should and should not be kept secret, as well as what can be. If the top man's wife plays leading lady on a corporate TV show, it would be silly and potentially embarrassing to try to hide the fact. Again, it's usually futile to try to keep bad news a secret. The airlines, for instance, used to think they could hide news of crashes by throwing reporters off the scene, refusing passenger lists, all but denying a crash had occurred. Public relations counsel persuaded them, finally, that the best method is to tell all and tell it quickly. The sooner and the more completely the bad news is told, the sooner it drops out of the headlines and the public mind.

Or consider the Eastern railroad, one of whose freight cars jumped the track on an overpass and landed on a city street below. Next day, a director of the railroad wrathfully demanded of the public relations man, "Why didn't you keep that one out of the papers?"

Some things are just too big to keep under cover. END

MACHINE TOOLS

continued from page 48

magnetic tape, which is subsequently fed into the control system on the factory floor by the operator. Some manufacturers offer a faster-acting director with their systems. In one instance, the director is eight times as fast as the machine tool, which means that one director can prepare magnetic tapes for as many as eight numerically controlled millers. Of course, if a single machine tool is all a company needs or can afford, a system with a built-in computer and director might be the answer.

The cheapest solution, especially for the small job shop, may be to do without a computer or director. Two control manufacturers, General Electric and Stromberg-Carlson, are setting up tape-preparation centers in various strategic cities. The other control manufacturers are also making tapes or punched cards for customers. The centers will take over the entire routine—manuscript writing, punched tape, and conversion to magnetic tape. All they need is a blueprint, the nature of the raw material, and a list and description of the cutting tools in the shop. They'll return a can of magnetic tape in short order, with careful instructions on clamping the work piece to the machine. (Because the cutter is always moving at the highest possible speed, the work piece has to be clamped very rigidly to the work table to prevent error due to work piece deflection.) Farming out tape-preparation, however, means sacrificing some control, turning down emergency jobs, and passing up any chance to introduce innovations in the tape preparation procedure.

These tape-preparation centers will undoubtedly make it easier for small manufacturers to buy numerical control. But that still leaves the small shop with the big responsibility of finding enough challenging work for the new tool to pay for the heavy capital expenditure.

How many axes?

Most of the numerically controlled milling machines now in use are either two-axis or three-axis types. The two-axis millers (and one grinder) move the tool about in one plane—enough to generate cams, profile templates and many flat parts. Three-axis machines add up-and-down control to the spindle, to make complex parts or dies.

However, there is a limit to the shapes that a three-axis machine can cut. If the part has a twisting surface that curves back on itself (as in many turbine blades), a three-axis machine either balks at the job or takes too much time. One solution to the problem, offered by Ex-Cell-O Corp., Detroit, is to revolve the workpiece while the cutter moves in

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three axes. This new combined miller and precision grinder costs $185,000, including controls.

Extra axes, of course, cost money—around $15,000 worth of additional controls each. It doesn't pay to order a five-axis machine unless there is enough work for the extra axes. James McDonough, President of Concord Controls, Inc., Boston, asserts that the five-axis G & L machines his company has equipped use all axes 60 per cent of the time, which would justify the added cost.

The tool wear question

In any discussion of numerical control, the bugaboo of "tool wear compensation" inevitably comes up. It's true that the accuracy of most present systems depends on the unvarying diameter of the cutting tool associated with each tape. But in practice the problem isn't too serious: the 100 or so numerically controlled millers in the aircraft industry are turning out loads of production, even though few if any of them can compensate for the inevitable wearing down and resharpening of the tool.

Various schemes for compensating for the inevitable wear on the cutter have been suggested, but only one—the British E.M.I. controls adapted by Cincinnati Milling Machine Company—offers it at present.

To counteract tool wear, most experts suggest that only new cutting tools be used with the original tapes or cards, and that the ground-down cutters be held for new jobs in which their diameter is the base for preparing a tape. Since a numerically controlled machine would only pay for itself in a busy shop, it's fairly safe to assume that there would always be work for the life of each tool, no matter how many times it is reground. Other experts say that the reground tools should be set aside for use in roughing cuts or for conventional machines. Another solution is to use only cutting tools with replaceable hard-carbide inserts. Whenever the inserts wear, they can be inexpensively replaced without changing the critical diameter of the cutter.

Although the great majority of numerically controlled millers will always be working on metal, they also have applications in the optical and plastics industries. Powerful, aspherical lenses with unusual surfaces have been turned out on an experimental basis at Massachusetts Institute of Technology. One of these lenses could replace the present systems of lenses in cameras, telescopes and other fine optical instruments. In developing new plastic parts, prototypes can be cheaply machined by numerical control. Irremediable errors in dies, costing tens of thousands of dollars, will be avoided.

If rushed, one control manufacturer will deliver equipment in four months instead of the usual six to eight. But there's not much point in getting a control without a machine tool, and they still take at least six months to build. Other control manufacturers take up to fifteen months to deliver equipment.

Once a machine is installed, it may take months to shake down. The accuracy of the machine is affected by any settling, and extra-heavy foundations are a must. Again, one or more of the tens of thousands of connections may have worked loose. Since electronic components generally fail faster in the first hours of use, early reliability may be low.

The future of numerical control

Less than ten years after the Air Force first contracted with M.I.T. to start working on the task (Ferranti in England started at the same time), numerical control is still in its infancy. With only a few years of operating experience on the earliest machines, plenty of improvements remain to be made. While machine tool builders are redesigning their equipment to match the capabilities and special requirements of the electronic controls, the controls themselves will also evolve. General-purpose fixtures and workholders are on the way now, according to L.S. Peck of Autonetics, Downey, Calif. James Childs of Republic Aviation suggests that eventually instructions will be included in the tape for automatic work holders that will swing back and so allow the cutter to get by.

Although only one of the present control systems is made entirely without vacuum tubes, a few years from now all the controls will run on transistors. This will mean more compact equipment on the factory floor, greater inherent reliability, and perhaps lower cost.

Although greater standardization seems a certainty, customers will undoubtedly be able to order variations—at added cost—to meet special requirements.

Tape preparation will be simplified and made more routine. M.I.T. is now working on the problem of giving greater responsibility to the computer. Some day the computer will be able to machine parts directly from the blueprint.

Another logical step in the evolution of numerical control—tying together a line of general-purpose machine tools—already exists. None of the individual machine tools in the "Digitape" system (see DR&MI, May 1958, page 61) of Hughes Aircraft Company, Los Angeles, is so complex as the milling machines discussed here. However, DR&MI has learned that a contouring miller will soon join the system.

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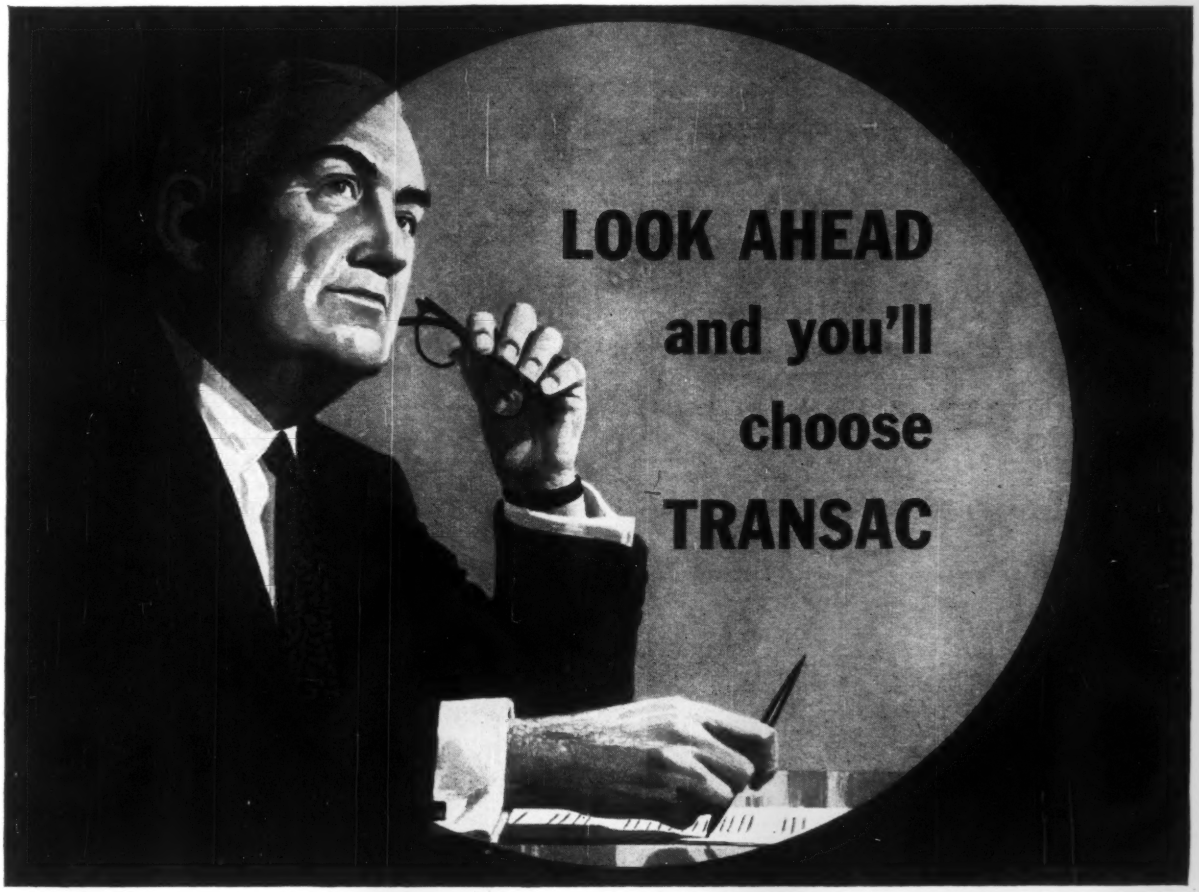

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cation of numerical control to industry. Lead time and development delays will be cut sharply.

Demands on management judgment will continue to rise. When a company has $100,000 to $500,000 tied up in just one machine, it must be properly loaded to pay off.

Industry will need fewer skilled machinists and toolmakers. Logically, many of these will be promoted to parts planning and tape preparation, or shifted to the all-important job of preventive maintenance.

Labor's reaction

Although the aircraft industry, whose workers are used to rapid technological change, had no labor reaction to numerical control, trouble is likely to develop in other areas. That means management must start to educate labor now to accept numerical control—and it is another reason why plant executives should start informing themselves now on the future impact of numerical control on their factory operations and organization.

Further in the future, though far from just a dream, are other consequences of this new technology. For instance, stocking and selling of replacement parts should be revolutionized. Job shops equipped with the numerical controls will to some extent replace parts inventories. Whenever a customer needs a part, the right tape will be taken out of a library and run into the control—and the order will speedily be filled. Only a small, comparatively low-cost stock of metal and forged shapes (and plastics, too, to make washing-machine impellers, for instance) would be in inventory. Such a shop, when it isn't busy on replacement parts, could take in work like any job shop.

A manufacturer who couldn't afford such a network of replacement part shops might make deals with existing job shops to handle his parts line. Conceivably, a shop could handle many lines, maintaining a large library of tapes.

When numerically controlled tools are widely distributed, the replacement part business could undergo a further transformation. Instead of selling parts, it may well be, manufacturers will rent tapes to the customer, who will make the part on his own machine.

Like most of the break-throughs of the past decade (with the notable exception of the transistor), numerical control was conceived in response to a defense need. But it has found civilian employment much quicker than the others. While helping us to meet the challenge of Soviet weaponry, its greatest benefit may turn out to be a revolution in the U.S. industrial plant that will help us continue to out-produce the ambitious Russians. END

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The Ida Cason Callaway Gardens in western Georgia is a non-profit 2,500-acre paradise of tall trees, cool lakes, wildflowers and sunshine. 25,000 people, motoring an average distance of one hundred miles, find beauty here on a sunny weekend. They boat and they swim. They bask on clean white sand—19,000 tons of it, hauled in to carpet a crescent of lake shore. They play golf, they picnic and they stroll along miles of flower-studded paths.

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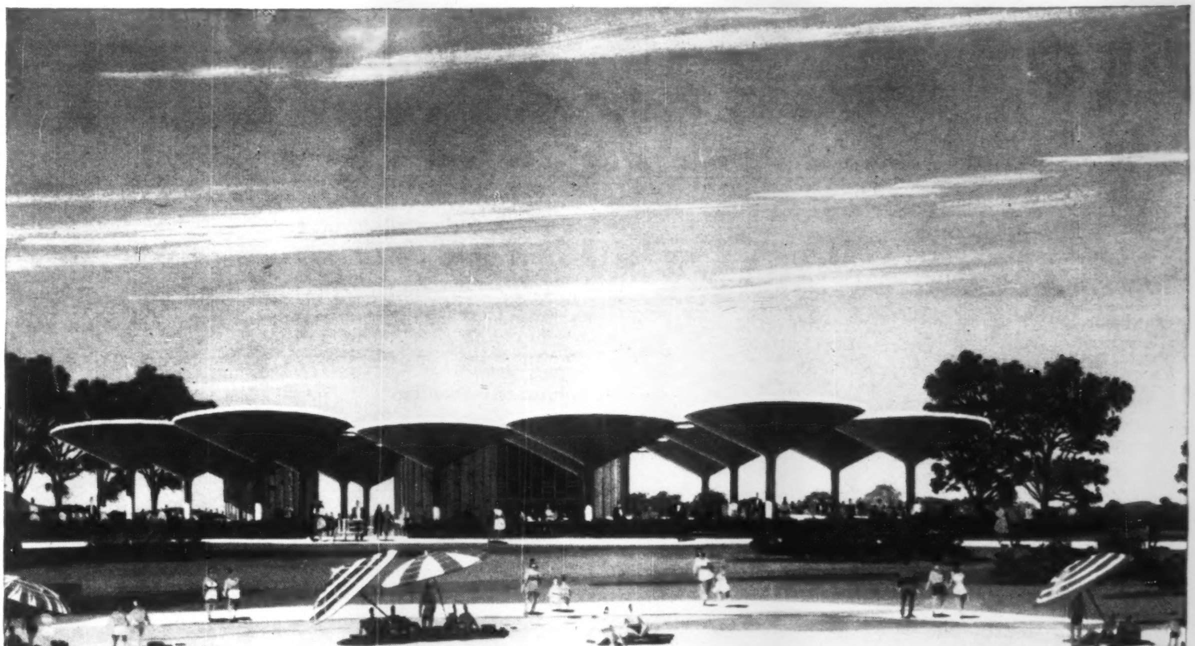

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Bad news telegraphs its punches in a substantially rental business like IBM's Data Processing Division. Any dropoff in sales affects company growth about eighteen months later, when deliveries are made. Thus, this division's income still is holding up well, although the pinch began to be felt last September and sales dropped as low as 50 per cent of normal in the intervening period. But if current measures taken to toughen up the sales team prove effective, good news may be on its way long before the sales slowdown makes itself felt in the corporate pocket book.

RAMACADE *travelling business show saved twelve months in getting a new product before prospects like these and, as a bonus, eliminated need for millions of dollars of inventory.*

Late last year, when top management wanted to get a new medium-cost data processor, the RAMAC (Random Access Method of Accounting and Control), out in front of customers and prospects, it could have waited a year until enough demonstrators were available to fill orders and show off in each branch office. But the squeeze on sales dictated another course. The company equipped three large trucks with three demonstrators and toured the country with them, showing the RAMAC and other IBM electronic products to 65,000 customers and prospects in 25 cities.

The "Ramacades," as the travelling units were known, held customers who had already ordered and gave new sales a gratifying spurt, months earlier than would otherwise have been possible. And, as a bonus, there was a saving of several million dollars in inventory, representing the additional demonstrators that were not needed. By lessening the gap between creation of a new product and its sales, IBM's method of introducing RAMAC may well take some of the sting out of the reduced income implicit in sales loss on other products.

Field play

Fundamentally, what the Division has done to convert a hard-times minus into a sales plus is simple: Cut down on salesmen's paperwork, get salesmen out of their own offices sooner and into prospects' offices longer, put managers—from branch office executives to headquarters brass—out in the field more of the time, improve and increase in number the demonstrations and presentations, spotlight both good and poor salesmanship, and put a premium on new accounts. "A salesman is effective only when he's in front of a prospect, and in our company this is about 180 minutes a day," says Thomas J. Watson, Jr., IBM's president. "Anything we do here to improve his time with prospects is money in his pocket and ours."

One point of concentration, therefore, has been to step up sales calls by 25 per cent without increasing the number of salesmen or requiring more time of them. Since salesmen have averaged four calls a day, this means devising ways for them to add an extra prospect daily. One way is to get the men out of the office at 8:30 or 8:45 AM instead of 9:00 or 9:30 and to keep them out until 5:00 PM instead of 4:00. Even lunch hours will not be wasted if the company has its way: salesmen are encouraged to take prospects to lunch.

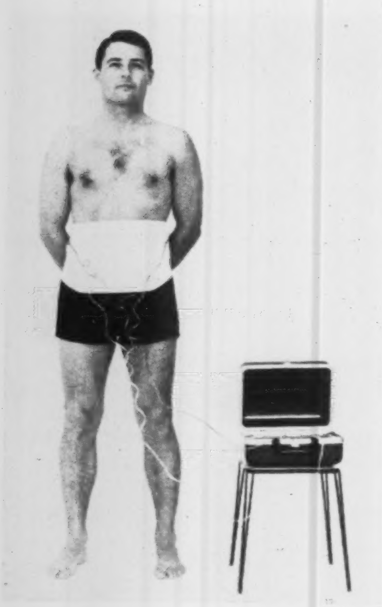
More selling, less scribbling

For another thing, sales meetings have been shortened. Occasionally a branch manager will hold one as a breakfast meeting in order to get the men out "on the street" even earlier. In addition, work that can be done by clerks *is* done by clerks. Paperwork is cut down by requiring less information from salesmen on their orders. Previously, they had been required to write up lengthy specifications, since each order to some extent involves equipment especially adapted to the customer's needs. Now, however, a clerk from the administrative staff goes out and gets the details, thus freeing the salesmen for selling.

Salesmen's calls have already increased 15 per cent on the average, according to Robert W. Hubner, divisional sales manager, who is responsible for "Project Spark," as the division's current campaign is called.

Branch managers and their assistants are under pressure, too, to bring up the number of calls. They are expected to spend at least 15 per cent of their time in the field, making calls with or without salesmen. Each week they must report to their district managers on how many hours they have spent in the office and in the field, and—most important—how many calls they have made with younger salesmen.

Although salesmen's quotas are still set on a monthly basis, reports on their performance are now required weekly—another sign of the stepped-up pace of selling and the closer watch that is kept



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No place to hide

Since every salesman's record is on display in his branch office, the spotlight is on the laggards as well as on the "king," and they cannot keep their poor results a secret between themselves and their boss. This becomes a powerful added stimulant to them to upgrade themselves. Under such circumstances, a salesman is seldom bottom man two weeks in a row, says Hubner.

Salesmen's compensation has been adjusted to put a premium on pioneering new accounts, since that's where the growth potential lies. In explaining the company's reasons for this move, IBM President Watson recently told an American Management Association audience:

> Selling techniques have changed tremendously in the last fifteen years. . . . We have recently been examining our own salesmen's activity. In the happy, easy selling days of the past ten years, we have increased our individual sales quotas 600 per cent. This increased quota has forced our salesmen to by-pass the small prospect and concentrate on wholesale selling. This is a significant change in our pattern and, if allowed to continue, could reduce our business to a basis where we were adding almost no new customers. From 1937 to 1957 our business grew from $30 million to $1 billion, and our customers from 2,000 to 20,000. Obviously our growth must be continued on a basis of adding many new customers each year. . . . We conclude that sales and marketing in our own business at least, can get quite warped in times of boom. If these same plans are used in times of lessened industrial activity, they can well change the entire course of the growth of our business. . . . We know that from a long-term growth view, a dollar of new rental is more valuable to us than a dollar of additional rental in an existing customer's account, and our new commission rates will reflect this.

Management aids include visits of top divisional or corporate personnel to each of the approximately 200 branch offices at least once a month. Here, they will call on customers and prospects, take part in seminars conducted for prospects' executives, and participate in sales meetings.

Fifty package demonstrations have been provided for all branches. Based for the most part on real-life applications, they show how varying kinds of equipment are used to meet different problems in different industries, often in a widely known company or governmental unit. Outlines of short executive seminars, conducted partly by divisional headquarters personnel and partly by the field staffs themselves, are made available. A third aid is a guide for conducting detailed workshops for CPA's and for management personnel who will be directly concerned with operation of the equipment. Also, for "hot" prospects, there are trips to IBM plants, education centers, and the White Plains, N.Y., headquarters, where similar sessions are conducted. For the first time, too, the division is putting together in pocket sales kits, one for each industry, the special information needed to sell in that industry—how much business of a given kind a prospect must have in order to utilize electronic equipment, key questions for the salesman to ask, and the like.

Every customer counts

One major company policy—to maintain a "small company attitude" despite its rapid growth—has found an application in the current sales effort.

"In dealing with a large company like this," says Sales Manager Hubner, "it's easy for a small customer to feel that his business is just a drop in the bucket to us. We don't feel this way. The problem of a small grocery wholesaler who uses IBM equipment is my problem. But I have to prove it."

One way Hubner "proves it" is to see that complaints are handled immediately. A few weeks ago, for instance, there came to his attention a service complaint from a small banker. Immediately he telephoned the IBM branch manager in the banker's town. The phone call saved letter-writing delays through three layers of management—headquarters to region to district to branch. Even more to the point, it undoubtedly persuaded everyone in that branch, at least, that when the sales manager says he wants complaints handled promptly, he means it. —A.G.L.

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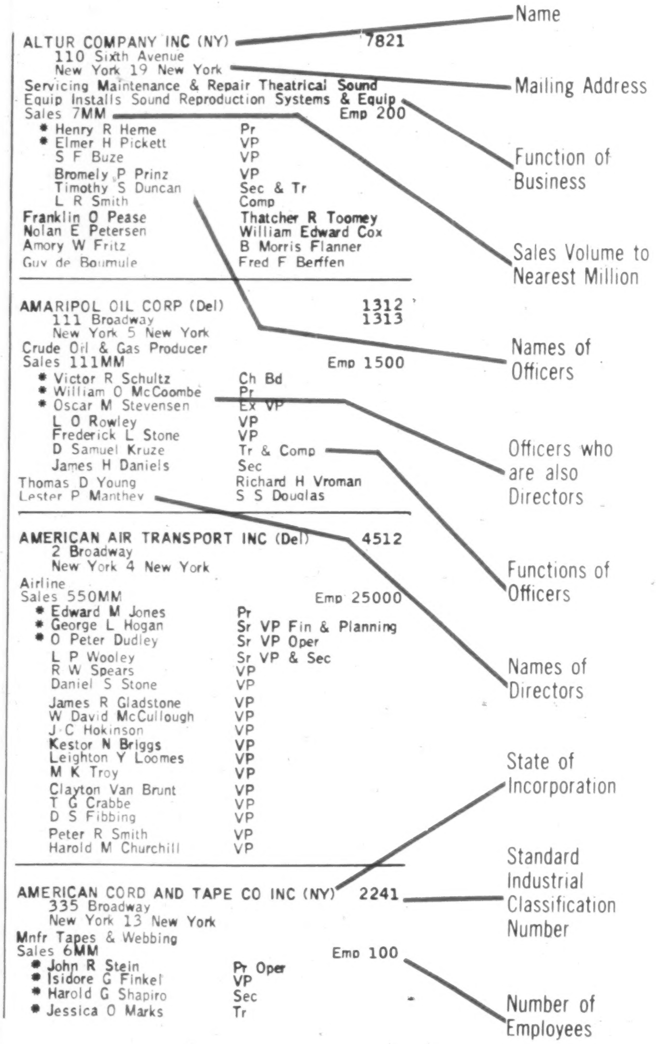

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ANNUAL WAGE INCREASE

continued from page 41

metals, or any other commodity. Whether this attitude is ethically or economically justifiable is beside the present point. What is important for the moment is that any consideration of continuous wage increases must be based on the realities of pattern bargaining.

In addition to their application of the pattern technique, unions have made wide use of the "productivity increase" or "annual improvement factor." Consider the recent negotiations in the automobile industry. The United Auto Workers and the motor companies were not debating the question of wage increases. That was already decided. When General Motors offered to renew their contract on the same terms as the expiring agreement, UAW members were assured of an annual wage increase for each year of the new contract. This is the so-called "annual improvement factor" which automatically increases wages every year by 2.5 per cent or 6 cents an hour, whichever is greater. The question at issue was, "How much?"

Twisting a principle

As a matter of fact, the annual improvement factor or "productivity increase" is being used throughout industry to rationalize unjustifiable wage increases. The basis of the rationalization—that workers should rightfully share in the benefits of technological progress—seems plausible enough. The principle, however, gets out of hand in at least two major instances.

- Where it has proper but limited application—as in the steel and automobile industries, for example—but the cost of the wage increase substantially exceeds the value of the productivity gains.
- Where the same relative increases are applied to services and occupations which by their very nature can return little or no compensating gains in additional productivity.

Several writers on economics have pointed out that much of the rise in the cost-of-living index can be attributed to constantly increasing prices for services. In transportation, for instance, the carriers that operate trains or buses on scheduled routes find it well-nigh impossible to offset the cost of higher wages paid to locomotive engineers or bus drivers—except, of course, by raising fares. Automation cannot do much to increase the output of, let us say, a stenographer or a research chemist. To a very considerable extent, then, the annual productivity increase is simply a device used by unions as a lever to pry general wage increases out of industry. Corporate managers know this as well as labor leaders.

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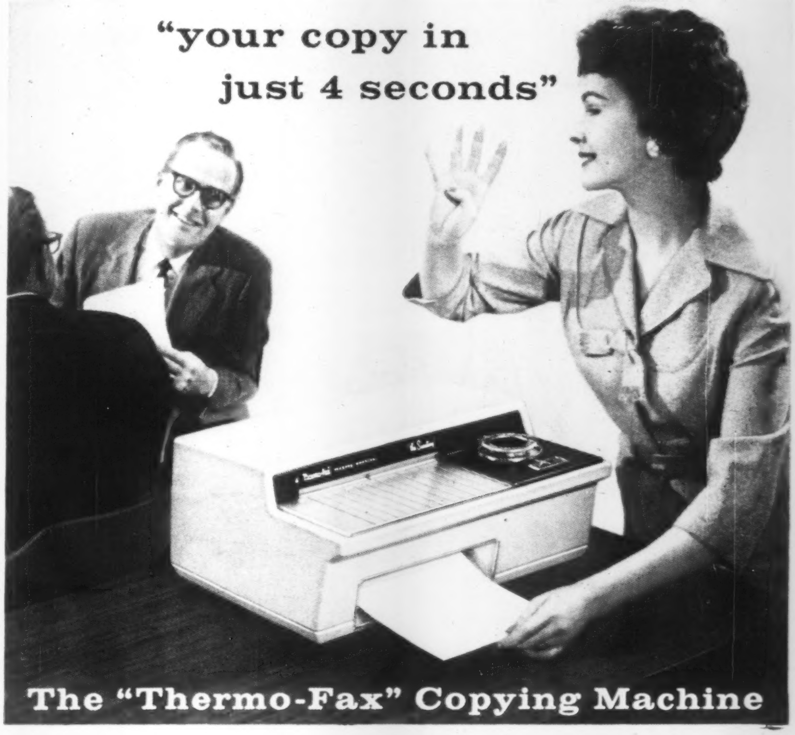

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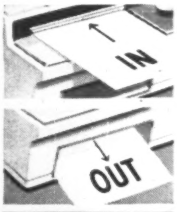

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Map shows the vast western area served by Union Pacific.

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From pattern bargaining and the principle of the productivity factor—both accepted reluctantly by industry—has evolved the new concept of the annual wage increase. Keeping in step with the march of wage rates is that unwelcome partner, the annual price increase. While learned economists debate the causes of inflation, the wage-price spiral appears to most people the obvious answer. How, then, can we tackle the root cause of the problem, the annual wage increase?

Negative cures

One school of economists holds that the only cure is a depression, with accompanying heavy unemployment. This is a counsel of despair. It may prove to be the only solution, but there is still time to try others.

Wage and price controls administered by the Government are thoroughly distasteful to all segments of the public. This method, too, is an admission of defeat. In any event, in the present climate of public opinion this approach is politically inexpedient.

THE AUTHOR • John W. Jordan, a member of the New York and New Hampshire bars, is counsel for a large New England pulp and paper manufacturer, where until recently he had active experience in labor relations. He practiced law until 1943 with Medina & Sherpick where he wrote briefs for the then senior partner, Harold Medina, later judge in the U. S. Circuit Court of Appeals. Mr. Jordan is currently serving as the chairman of the Personnel Commission of the State of New Hampshire.

A moratorium on all wage and price increases by voluntary agreement of labor and management is a pious thought—and can be promptly dismissed as thoroughly impractical. The jousts in the press last year between Walter Reuther and the automobile manufacturers illustrate the utter futility of trying to work out a constructive solution by joint action of the parties outside the area of the normal collective bargaining process.

What about the unions taking the initiative? At a recent convention of the AFL-CIO, the proposal of a bold union leader that unions drop demands for additional wage increases for one year, was promptly and thoroughly repudiated. This is hardly a surprise. The imperatives of present-day union leadership simply forbid any such course of action. Union leaders are, above all, politicians. They must promise "more," they must get "more." After a decade of annual wage increases, they have become the victims of their own aggressiveness and management complaisance. In short, they are responsible for a union attitude which takes it for granted that personal income will be enhanced every year through regular wage boosts.

The problem is not limited to this present climate of belief. Perhaps even more serious are the influences of rivalries existing among powerful and ambitious labor leaders. Reuther, it is said, must overcome this year the wage rate advantages which David MacDonald's Steelworkers obtained two years ago. But if Reuther forges ahead this year, the situation will simply be reversed in 1959, when the Steelworkers' three-year contracts expire.

Thus the union position. While an educational program holds out some hope that unions may agree to corrective measures, it is futile to expect them to initiate action—at least at this time. The modern American labor leader has yet to learn the lesson implicit in the words of the ancient Greek: "Of all manifestations of power, restraint impresses men most."

One way out

Barring a depression, the only hope of controlling the annual wage increase lies with industry itself. The difficulties can scarcely be overestimated, but management must face them. To begin with, industry—particularly big industry—shares with organized labor the responsibility for creating and perpetuating the wage-price spiral. Business managers have tried for years to grapple with powerful and resourceful unions without getting hurt. To avoid costly strikes, management has bought labor peace with long-term contracts providing unrealized productivity increases, cost-of-living formulas, and ever growing fringe benefits. In order to maintain adequate profit margins and placate stockholders, industry has all too often passed along these higher costs to the public in the form of price increases. This has been the pattern for the past decade. Can industry change it at this comparatively late date?

Management, it is often said, ought to show stiffer resistance to unreasonable demands. Unfortunately, the answer is not that simple. A quick turnabout in industry's attitude would inevitably precipitate the very strikes which management has so dreaded in the past and paid so high a tribute to avoid. A rash of strikes would be one solution. It would, however, be financially costly to both sides—and it would be attended by great hardships and violence, not to mention prolonged damage to labor-management relations in general. Yet, if there is to be a peaceful solution to the problem, one party or the other must modify its stand.

Absorption of wage increases by holding the price line offers hope of a solution, painful though it may be. Indeed,

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consumer resistance to high prices may leave producers with no choice but to hold to present prices, if not to reduce them.

By increasing prices in amounts sufficient to cover additional wage costs (or even more than cover such costs), management in many basic industries has forfeited the strongest weapon in its arsenal of collective bargaining arguments—namely, "We cannot afford it." To be sure, the words have been uttered frequently in countless negotiating sessions, but with an all-important if unstated qualification: ". . . but the public can." The inevitable price increase follows. The blunt fact is that business and labor have too often conducted negotiations with the tacit understanding that the higher costs of the settlement will be passed along to customers.

Eyes on the profit curve

Thanks to price increases, most of the country's leading industries have shown an almost constantly ascending profit curve, despite large annual wage increases—that is, until recently. While many industry spokesmen have pointed out that higher profits are needed to offset inadequate depreciation allowances and high replacement costs, such subtleties are lost on the average worker. What the worker has seen is what his leaders have pointed out—higher and higher profits. It is gospel now that the workers shall receive their "fair share" of higher profits. How can management defend itself from the annual onslaught?

As a result of passing the burden along to consumers for the past decade, few of the country's major industrial corporations have suffered seriously from granting annual wage increases. They have absorbed higher wages only partially or not at all. But thousands of smaller companies in highly competitive lines of industry, such as textiles, paper, and so on, *have* been absorbing it. Many companies have been "patterned" almost to economic death, largely as a result of constantly rising labor costs, which cannot be offset by higher prices.

Needless to say, leading industries could not repeatedly absorb wage increases in order to hold the price line. One should be enough. If, as a result, profits began to decline or even level off in the face of increased sales, management could come to the bargaining table with an unshakable position: "We cannot afford it—and here's the proof." But unless and until the major industries demonstrate more willingness to shoulder the burden of higher labor costs, the public will hardly sympathize with them when they take a stiff position against continued union demands.

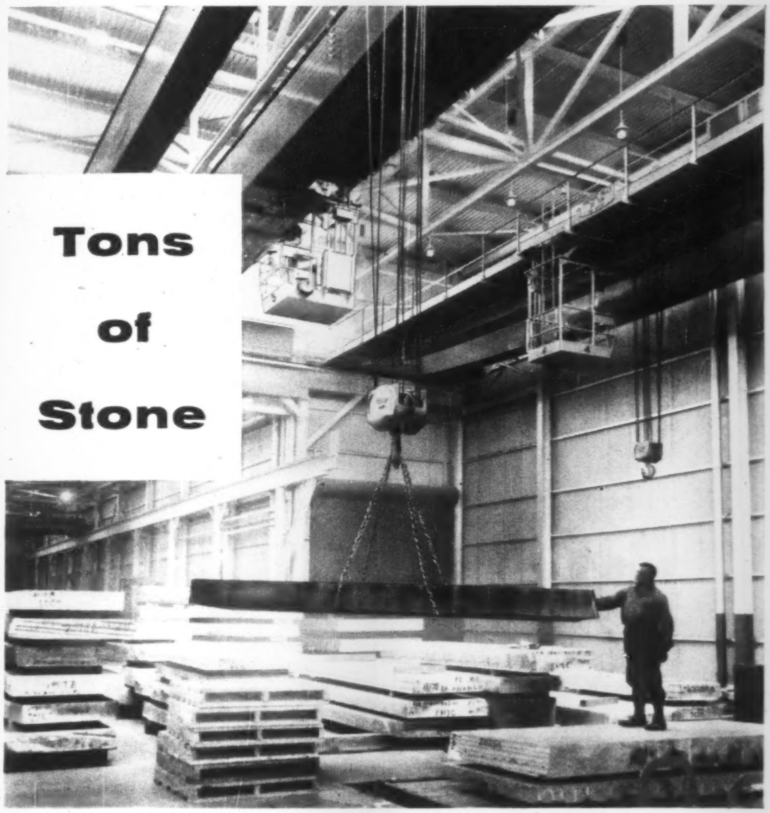
Essentially, industry's task is to educate union leaders and the rank-and-file to the need for deferring further wage increases until they are justified by higher productivity. Responsible labor leaders are well aware of the importance of profits in our economy. They must be further convinced that profits must be maintained *through higher productivity*, not through price increases. In a word, the source of the profits is as important as the profits themselves.

Breaking the pattern

The pattern-bargaining technique employed by union negotiators is essentially an application to adult affairs of the children's game of "follow the leader." Testifying last August before a Senate subcommittee on antitrust and monopoly, Roger M. Blough, U.S. Steel board chairman, suggested that "neither the steel industry nor any other industry ever sets the wage pattern in America." Many corporate managers would dissent vigorously. Surely the wage settlements effected by leading industries contribute to the maintenance of broad trends which affect all industry. Labor negotiations in steel are invariably front page news. And they perpetuate a state of mind. All over America union members are thinking, "We're next. If there is more for the steelworkers or auto workers, there will be more for us." And labor politicians give them that assurance. One settlement feeds upon another in an endless chain of wage increases. It makes little difference which industry started it all. The question is how to break the chain without paying the penalty of costly strikes.

The nature of the problem is such that leadership must inevitably come from the major industries. In his testimony, Mr. Blough recalled the "noble experiment" in 1948 when U.S. Steel, in an effort to combat inflation, reduced its prices instead of granting the union's demands for higher wages. After three months of wage and price increases in other companies, "we had to rescind our price action, increase the pay of our workers, and try to catch up with the parade, we had fallen so far behind." One may wonder if this ten-year-old episode is the final gesture of American industrial statesmanship in dealing with the unjustified annual wage increase. If so, this suggests an image of American industry as a leaderless herd, moving instinctively and blindly towards a common objective with no member sufficiently courageous to detach himself and change the direction. That image hardly jibes with the record of American industry's dynamic achievements in production and research.

So far, management has merely been raising prices and postponing the crucial issue. Yet, if the annual wage increase, with all its inflationary implications, is not to become a permanent fixture in the American economy, that issue can no longer be avoided. END



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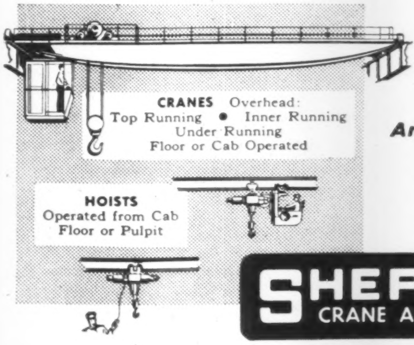

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Some people are doing it today . . . in Bermuda, the Caribbean, the Persian Gulf. Proof that water supply engineers . . . making bold use of alloys with Inco Nickel in them . . . are already on the right track.

Still problems to be solved

Problems of design, of method. And economic problems: the present price of de-salted ocean water is too high for general use.

But designers of salt water distillation plants have come a long way . . . making good use, among other things, of the research on metal corrosion Inco engineers have been doing for 23 years and longer.

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To find out where and why Inco Nickel Alloys and copper-nickel alloys are so useful in de-salting sea water, write for our article, "Only the Waters of the Sea." Write Dept. 138G,

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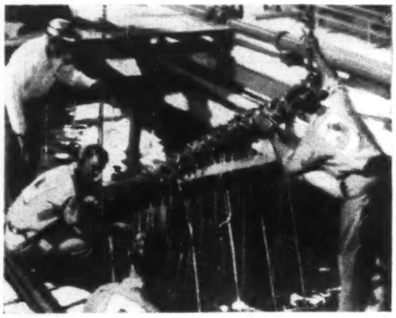

METAL CORROSION research at Inco's Kure Beach-Harbor Island Testing Station helps distillation plant designers find the right metals to de-salt ocean water economically.

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Inside Industry

New methods, materials, and equipment

New Jobs for Industrial X-Rays

ALSO: *Double-Quick Electronic Assembly; Snappier Rubber*

INDUSTRY HAS long used x-rays to check welds and the insides of big metal pieces, but here's something new in industrial roentgenology: x-ray motion pictures. The technique reveals what happens inside electronic and electromechanical components under high stress. Higher reliability for the trickiest of all equipment—guided missiles—is the objective.

Rototest Laboratories, Inc., Lynwood, Calif., one of the leaders in "cineradiography," is currently studying higher-voltage, higher-speed methods that should be even more revealing than present techniques.

Philco Corp., Philadelphia, has developed a new device that enables a radiologist to get more out of still x-ray pictures. Called the Exicon, it enhances electronically the details of an x-ray shot. Although aimed at the medical market, the first sale of the $18,000 machine was to a manufacturer who uses a lot of industrial x-rays.

For plants that use radiophotography extensively, there may be hidden assets in old x-ray files. There are two ways to recover the silver—which is worth 90 cents per troy ounce. Through a new service, Handy & Harman, New York, will either buy outright, by the pound, the old x-rays of welds, brazed assemblies, and castings, or reduce them to silver and pay for the silver alone.

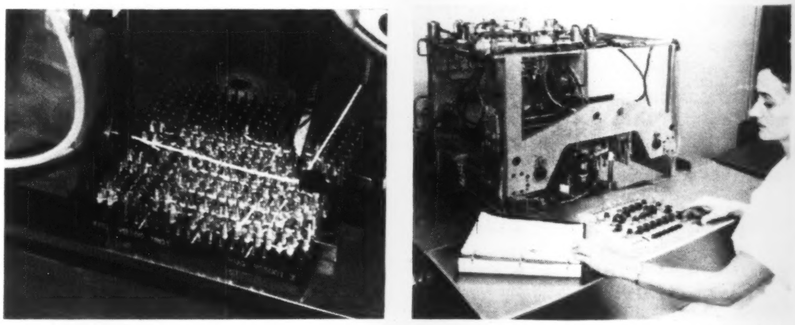
Another recovery method is to buy the refining equipment yourself. Oscar Fisher Company, Inc., Newburgh, N.Y., makes an electrolytic machine that gathers about an ounce of silver an hour at a cost in electricity of 2 or 3 cents.

In any case, clearing out your old x-rays offers an extra advantage—the release of valuable filing space that can often be put to more profitable use.

Tapes Speed Assembly

Doubled production rates in assembling short-run electrical and electronic apparatus are now possible with a new system called AIMO, which eliminates the need for detail blueprints because the assemblers are told what to do—by tape recording.

The new technique—AIMO is short for "Audibly Instructed Manufacturing Operations"—was developed by Westing-



LOOK, NO SOLDER! *The apparatus at the right is a tape—or hand-controlled wiring machine that makes tight connections without the use of solder. The wires are simply twisted around a terminal with a triangular cross-section. Developed at Bell Telephone Laboratories, the connections, made by a hand tool, are used extensively in the Bell System. A licensee, Gardner-Denver Company, Grand Rapids, Mich., developed this new $40,000 machine for the Hughes Aircraft Company. The twisting head, seen at left, makes the designated connections in a modular connection board, cutting off just the right length of insulated wire from a spool. Electronic components are soldered to the other ends of the proper connection terminals on the opposite side of the modular board.*

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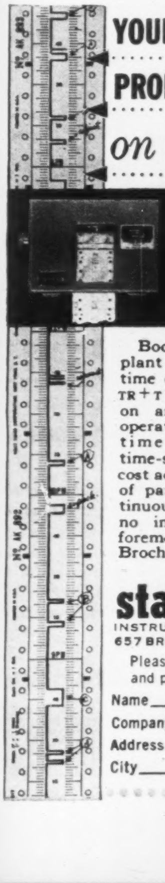

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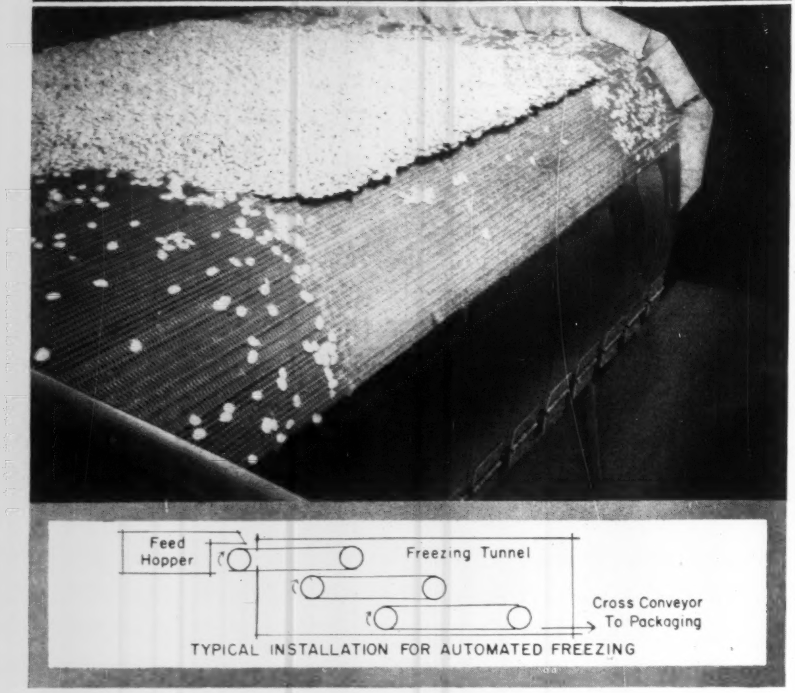
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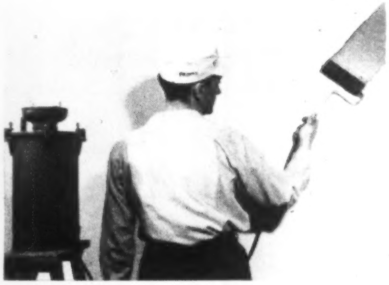


FASTER PAINTING: *Pressurized painting, usually associated with spray guns, is applied to rollers by Power-Flo Tools, Pittsburgh. And Ransburg Electro-Coating Corp., Indianapolis, has developed an electrostatic spray gun to paint an entire factory ceiling without dripping—a valuable asset where drop cloths can't be used.*

house in cooperation with Dictaphone Corp. and first applied to workers assembling complicated wiring harnesses. The instructions, which are recorded by a production engineer studying the blueprint, are played back by a recording machine at the workplace and transmitted without wires to a tiny receiver carried in the assembler's pocket and wired to a button-type speaker that's worn in the worker's ear.

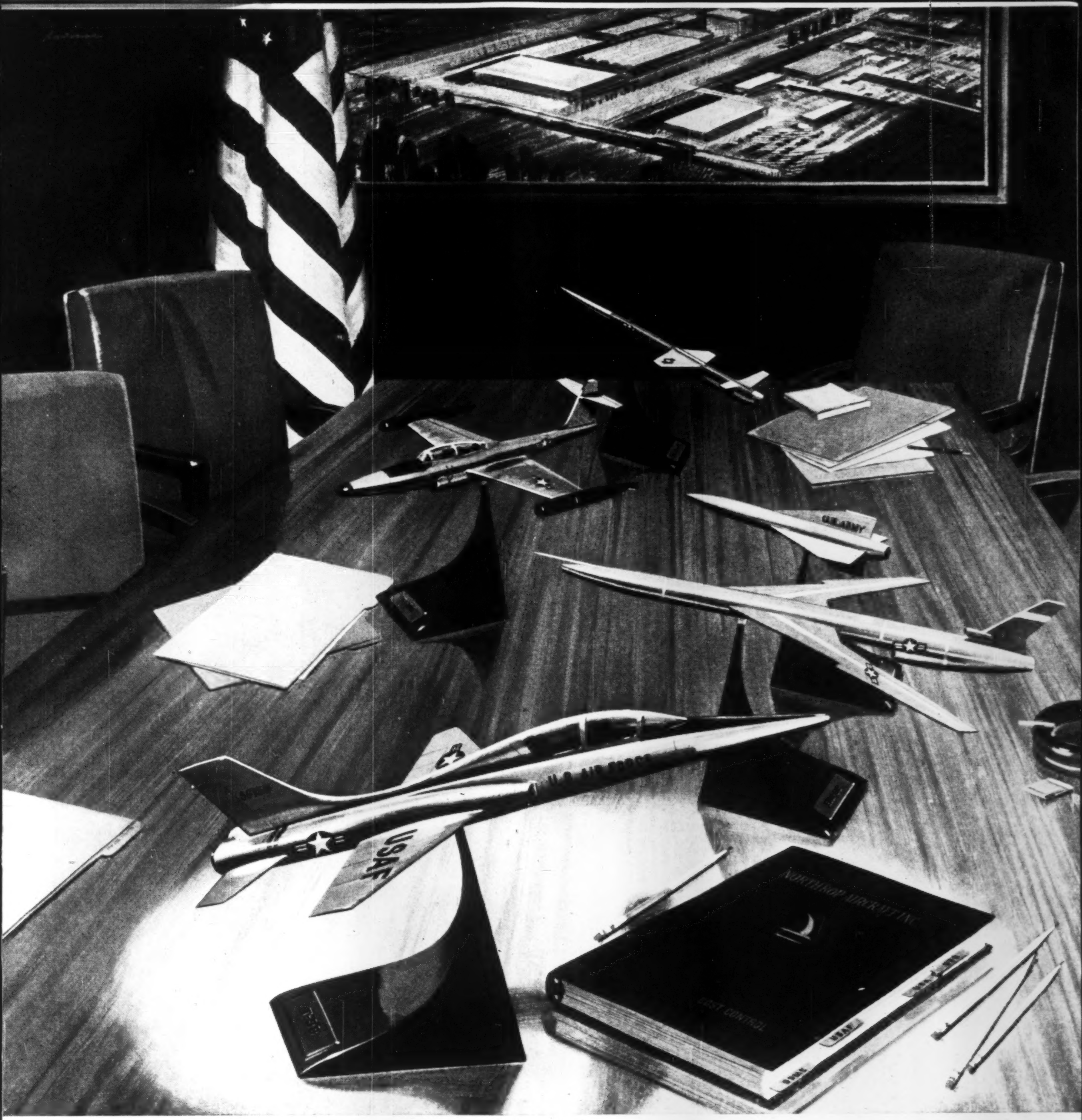
Since the worker starts each instruction by pressing a button, he can set his own pace. If he doesn't understand a point, he can quickly reverse the tape and listen again. The system can also be applied to short-run sheet metal stamping.

Among the advantages are:

- Reduction in learning time (even illiterates now qualify!)
- Less drafting time for detailed assembly drawings
- Higher productivity, since the worker isn't likely to be distracted by outside noises
- Greater freedom of movement, since the worker isn't tied to a blueprint
- Less blueprint storage space.

Super-Rubber

By substituting rare heavy hydrogen (deuterium) atoms for garden-variety hydrogen in synthetic rubber, a new kind of rubber has been created that's more elastic than the natural product. The new "deuterio rubber" was synthesized by a team headed by Dr. David Craig at B.F. Goodrich Research Center, Akron. Because of its high cost, the new rubber has limited commercial application, but should aid researchers in creating other more "rubbery" rubbers. —M. M.



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ASSETS

Cash and Due from Banks		$1,825,609,083
United States Government Obligations		1,500,873,223
State and Municipal Securities		434,348,869
Other Securities		125,705,651
Loans		3,965,541,628
Customers' Acceptance Liability		111,022,634
Federal Reserve Bank Stock		18,600,000
International Banking Corporation		7,000,000
Bank Premises, Furniture and Equipment		39,924,542
Items in Transit with Branches		9,660,709
Other Assets		18,146,624
Total		$8,056,432,963

LIABILITIES

Deposits		$7,132,710,136
Liability on Acceptances and Bills		116,096,503
Due to Foreign Central Banks		499,300
Reserves:		
Unearned Income		32,590,865
Taxes and Accrued Expenses		58,906,371
Dividend		8,280,000
Capital *(12,000,000 Shares—$20 Par)*	$240,000,000	
Surplus	380,000,000	
Undivided Profits	87,349,788	
Shareholders' Equity		707,349,788
Total		$8,056,432,963

Figures of Overseas Branches are as of June 25.

$838,308,165 of United States Government Obligations and $36,997,285 of other assets are pledged to secure Public and Trust Deposits and for other purposes required or permitted by law.

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HOW TO STAY HEALTHY

continued from page 43

inner conflicts that are not easily resolved. As profiled by Social Research, Inc., the leader has strong drives toward money and prestige, is impelled to keep moving, knows what he is and what he wants, and has a pervasive fear of failure. He identifies himself with his superiors.

Steadily bent on self-advancement, he also has unconscious desires for dependence, which he must resist.

Stress climbs with him to the top, and another promotion often means more pressure. But the rewards of high position usually temper the tensions of the job. Achievement, self-fulfillment, the successful direction of others can be counted as "psychic income."

What kind of man balances most gracefully on this see-saw? Dr. Franklin Ebaugh has described him thus:

- First, Dr. Ebaugh believes, the executive should be able to tolerate anxiety without converting it to physical symptoms or developing obsessive, perfectionist work habits.
- Second, he should have emotional maturity. This, says Dr. Ebaugh, will be manifest in spontaneity and willingness to accept responsibility, as well as good interpersonal relations—in business, recreation, and marriage.
- Third, the executive must be enthusiastic about his work. He should be proud of his role in the organization and his ability to meet its demands. This, in itself, is an aid in dealing with co-workers, since genuine enthusiasm is contagious. The old slogan "There is no fun like work" expresses a psychological truth. Those who work with pleasure usually work without strain.
- Fourth, the business leader must maintain a degree of physical tone. This, again, will help make him a good supervisor—less irritable, more impartial, more considerate of others.
- Lastly, Dr. Ebaugh suggests, the executive should be flexible. He should arrange for periodic changes in his activities. If certain aspects of his job are more monotonous or unpleasant than others, he should not concentrate on them for too long at one time. And he should be sure that his recreation provides a distinct change.

Living with stress

Obviously, an executive cannot change his personality as easily as his grey flannel suit. Nor can he change the nature of his job. Must he, then, resign himself to emotional flip-flops and physical deterioration? What can he do, both on and off the job, to minimize the drain on his physical and mental health?

The first and most obvious step is a regular physical check-up. His company may provide this or even require

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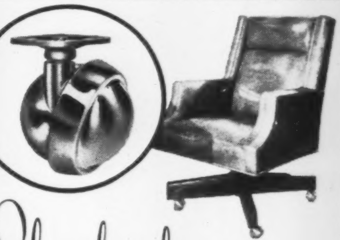

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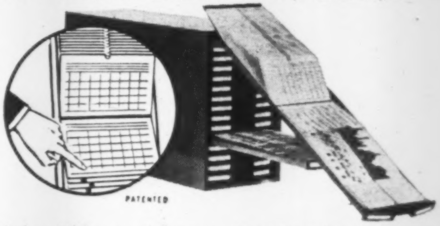

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it. If not, the executive should arrange for it himself. (When the company arranges it, the physician should report his diagnosis to the examinee only and not to the company president, personnel director, or anyone else. Men will be examined willingly only when they are assured that the findings will be kept confidential.)

The frequency of check-ups will depend on the executive's age and on his physical and emotional condition. Standard intervals vary from a year to a year and a half, unless special considerations warrant more frequent investigation.

Another part of any good health maintenance program is knowledge of certain signs of physical change. Today one of every four persons who get cancer dies prematurely because the disease was not caught in time—yet anyone can learn the "seven danger signals."

The standard advice to executives, of course, is simply: "Relax." Unfortunately, it doesn't take into account the requirements of an executive job or the demands of a goal-driven pattern of living.

There are, nevertheless, things the executive *can* do to ease his tension and relax a bit. For example, he can change his pace.

A better system may make it possible to do the job just as well, and without loss of effectiveness, but with less expenditure of effort. As someone has said, "If you're an executive, *be* one. Don't let the job *boss you*."

Several companies maintain retreats where, away from telephones, conferences, and social demands, executives can devote themselves to leisurely, yet stimulating and productive, discussions of company problems. Many return home refreshed—not because they had had nothing to do, but because they had been enabled to concentrate their energies on creative thinking without the frustration of constant interruptions and the strain of having to keep several balls in the air at once.

Vacation breaks

Vacations are advertised as the best means of relaxation, and so they are when properly used. But too often the vacationer who thrives on hard work comes home restless, bored, and worried about what has gone on in his absence. Executives might avoid such joyless holidays by splitting up vacations. Why not take brief breaks in Spring, Fall, *and* Summer?

If the company has a country club, or if the executive belongs to one himself, why can't he expend less nervous energy there and have more fun? Need one drink too much? Or play cards too long? Or eat excessively? Or sleep too little?

The head of a large research organization has solved, at least for himself, the problem of relaxing. When he comes home he works in his garden, makes additions to his house, and shoots some golf. But he stops before he is exhausted.

Though the word "moderation" may be as old as Aristotle, it's still a desirable ideal. *Some* eating, *some* drinking, *some* activity, *some* loss of sleep, but all in moderation, will leave a reserve for the next day. Dr. E. V. Allen has even suggested occasional fasting to offset excessive food intake. The meals served in executive dining rooms are often too high in calories, and a top management man rarely uses the company cafeteria where he might find less heavy, rich foods—and no alcohol.

Outside activities

An executive can't say no to all the demands of the community, but too many "extra-curricular" activities are a waste of energy. He needn't attend every meeting of every group, every board, every committee. The sponsors will often be satisfied with his name on the letterhead.

Conversely, the job-tired executive, who has never taken any part in community activities, may find it diverting to work with one or two organizations in his spare time—providing he doesn't plunge into their programs with the same intensity he gives his job.

THE AUTHOR • Jean S. Felton, M.D., is the newly appointed Professor of Occupational Health at the Graduate School of Public Health and Department of Preventive Medicine, University of California Medical Center, Los Angeles. A native of California who received his A.B. and M.D. degrees from Stanford University, Dr. Felton was Medical Director at the Oak Ridge National Laboratory from 1946 to 1953, and went on to become Professor at the University of Oklahoma School of Medicine. He is the author of numerous articles in the field of industrial medicine.

Even inside the office, he needn't be available all the time. An appointment system, for instance, discourages drop-ins who have little to offer and only take up time. One possible solution to the problem may be a competent assistant, who can handle minor communications and help organize his chief's work, and take care of the details.

One thing an assistant can't do is the boss's homework, and many executives think bringing home the work is part of bringing home the bacon. What are the pros and cons of executive homework, particularly as related to health?

On the positive side, an executive often finds that he accomplishes more at home, in a shorter time, where he is freer from interruptions and the working conditions are often pleasanter. Those who take home the lengthier documents and business reading matter do not find going through them at home a burden. It is often a form of recreation and provides a sense of accomplishment that may counteract the frustration of not being able to devote full attention to anything in the office.

For others, it may be bad practice. Since accomplishment does not always match intention, the briefcase may merely make the round trip with its contents unread. Where this happens, and the executive feels frustrated and guilty, he had better leave his briefcase at the office.

When retirement nears

A final factor in upsetting health is the prospect of retirement. Few men who have spent a lifetime in productive work are happy at leaving it. The executive close to retirement may find himself bitterly resenting the company though he himself may originally have helped to set the retirement policy. On closer view, he may find the opportunity for leisure less attractive than it once appeared. An Army colonel who had been retired for a year put it this way: "I always looked forward to doing the things I had wanted to do. But when I finally retired, I found that doing them wasn't what I really wanted, and they weren't pleasurable very long."

The problem lies in inadequate preparation. Many men have plans, but generally they are too diffuse or too impractical. There should be pre-retirement discussions with skilled advisers from many fields: the executive's physician, his investment broker, his real estate broker, his minister, and even a social case worker (there are some in private practice). The shock of retirement can be devastating, or it can be cushioned or even eliminated by the same kind of careful planning that the executive devotes to any of his other activities. And confidence in the future unquestionably helps to preserve health in the present.

As others see us

It helps to have physical examinations regularly and to minimize one's intake of desserts, drink, and tranquilizers. But the executive will never have a feeling of complete well-being without an understanding of human behavior—both his own and his associates'. He must have a genuine interest in discovering his own motivations and those of his staff, a sincere desire to lead and stimulate his group to greater productivity, and a wish to create a pleasant environment for them.

A feeling of health can be created, cultivated, and cherished on the job by developing a perceptive attitude and a warm feeling for others. The executive must examine, and recognize for what they are, any unreasonable hostilities, as well as any feelings of insecurity that make him unwilling to hire capable people because they might threaten his own position. It is often best to "talk out" such difficulties with someone who will understand—his physician, his minister, a psychiatrist, or a group of people on his own level.

Talking it out

With competent leadership by a clinical psychologist, a psychiatrist with industrial orientation, or an occupational physician well grounded in the principles of behavior, some group sessions have been extremely effective in helping executives review their problems with people.

In one such session, for example, a New England executive who had been transferred to a plant in the South complained that he could not "get through" to his subordinates. Another man wondered about the causes for the high absenteeism in his group. A third wanted to have an orientation program for employees started, but did not want to order its introduction and could not seem to motivate the personnel director to take action.

With gentle questioning and a permissive atmosphere, such a meeting reveals the escapes, the defenses, the insecurities that might otherwise lead to emotional tension and illness and to group hostility. Insight into one's own mechanisms of behavior can bring a sensitivity to the feelings of others, an appreciation of the worth of all who contribute to the organization, and an awareness that the distinction between executives and "ordinary employees" is an artificial one—both are people, and both share the same basic human needs and aspirations.

The search for a meaning

The last factor in health is the spiritual. Though many people refrain assiduously from defining their own personal philosophies, there are others who feel the need for some final meaning of life. Dr. Robert H. Felix, director of the National Institute of Mental Health, believes that one should think the matter through and decide which philosophy of life will give ultimate meaning to one's existence. He says, "You can accept religious faith as the answer—or you can reject it. But you cannot safely sidestep a decision about it."

Health is relative. It can be how a man feels on getting up in the morning, or what his physician finds on examination, or how good he feels when his staff produces well. Whatever the point of view, observance of a few commonsense principles can keep an executive physically, emotionally, and spiritually healthy—even though overworked. END

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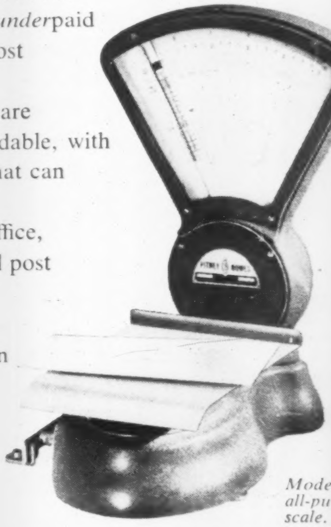

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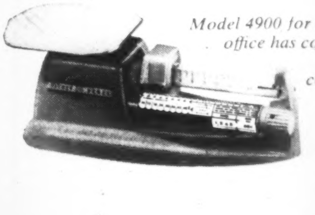

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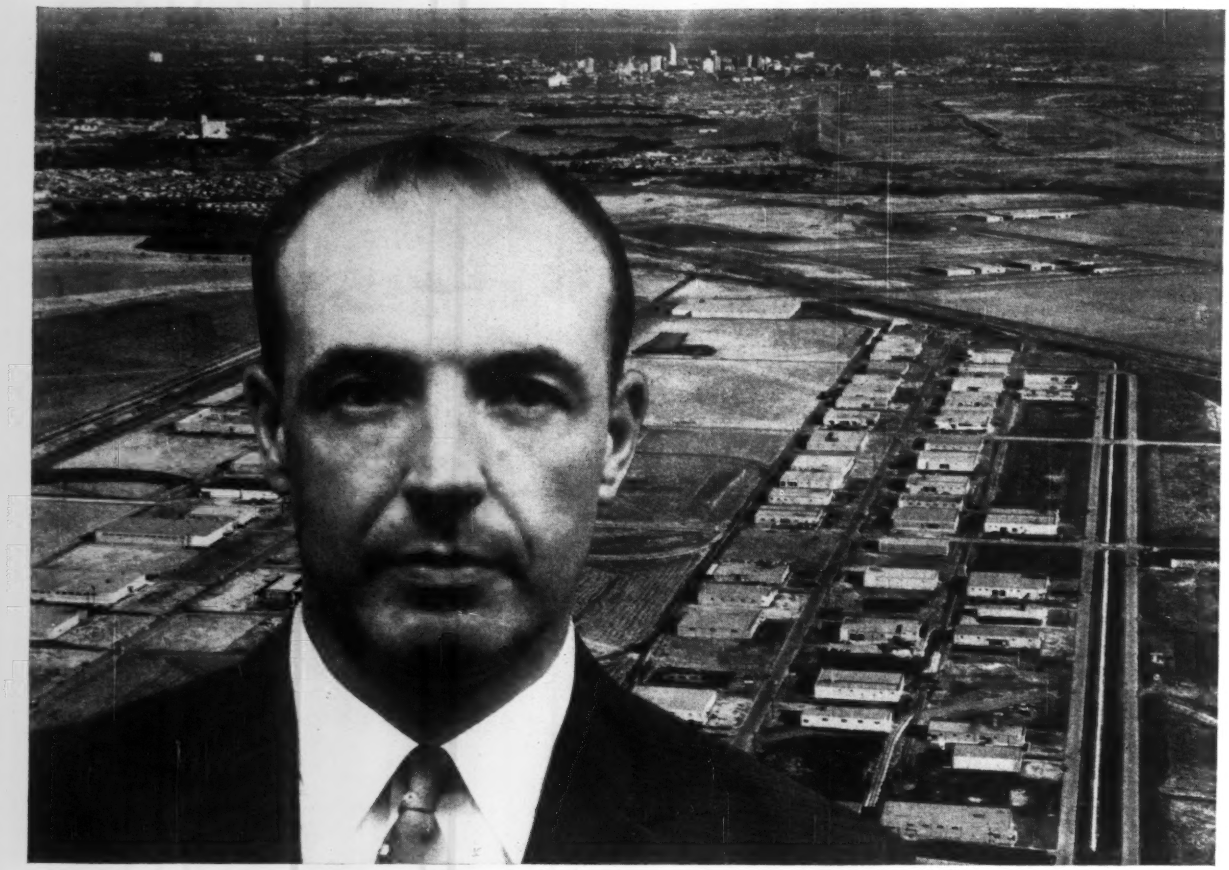

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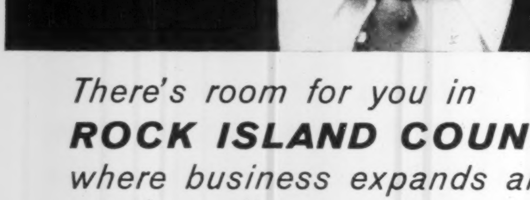

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Capital Views & Previews

Business and Defense: A Pentagon Profile

Two top Pentagon personalities speak out on industry's part in the defense effort.

PAUL WOOTON, *Contributing Editor*

COMPETITION FOR defense contracts, fanned by the recession, is far more intense than ever before. Most businesses, both large and small, are eager for a share of the $23 billion worth of contracts that will be awarded this fiscal year. And it's likely that defense expenditures will continue at the present high rate for some time.

That's one of the reasons, says Defense Secretary Neil H. McElroy, why business and industry have organized themselves to supply the Defense Department with the millions of items it needs.

Defense Secretary Neil H. McElroy

As McElroy points out, this present cooperative attitude has not always existed. Special equipment and facilities are usually required for military orders, and the spotty character of demand in peacetime plus the uncertainty of renegotiation and the possibility of political criticism discourage most suppliers from undertaking the necessary preliminary expense.

"Constructive competition"

The present need to put defense spending on a long-range basis has changed all that. Companies not only compete for contracts; many have even assigned a principal official to be in immediate charge of sales negotiations with the Government. "This constructive competition must be preserved," says McElroy, "but with it must go the over-all desire and intent to work effectively together."

The Secretary points out that the need for cooperation is greater "when one technological development outraces another, when the fantasy of today becomes the practical reality of tomorrow."

McElroy, like his predecessor, Charles E. Wilson, thinks an economy based on defense spending would be bad for the economy as a whole, and for defense in particular. The defense program should proceed, he says, on a well-organized, well-planned security basis, divorced entirely from pump-priming. McElroy welcomes the competition for contracts because "it means more defense per dollar."

Though the cost of defense is high, McElroy believes the American taxpayer is getting a rich return on his money. He cites figures to show that the 40-odd nations which have been receiving military aid from us have been spending five dollars for every dollar we have contributed to their military establishments.

"Of course," he adds, "no program wholly satisfies the desires of any one

Assistant Secretary E. Perkins McGuire

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of the services. Money for military purposes must be related to the ability of the country to support the program." Survival of the nation in modern war will depend on our ability to keep moving forward on the technological front, in his opinion. Moreover, says McElroy, technology has so transformed things that progress formerly measured in years is now measured in weeks and inventions are often obsolete before they get into production. We must also work on the assumption that new technological developments behind the iron curtain are at least keeping pace with ours.

McElroy thinks it is essential to security to have all defense research supervised by one man, regardless of which branch of the department is doing the work. Duplication and waste can thus be reduced.

The Secretary points out that so much attention has been centered on missiles and novel developments that we have lost sight of the progress made in the capability of waging limited wars. As extreme destructiveness makes a general war less likely, the chances of small wars seem greater. It would be unlikely, however, for a limited war to break out in the NATO area. That is more likely in some less industrially advanced part of the world.

He holds the purse strings

While McElroy is responsible for over-all Defense Department policy, E. Perkins McGuire, Assistant Secretary of Defense for Supply and Logistics, oversees more than half the defense appropriations. He works in close cooperation with the Small Business Administration and is particularly mindful of small companies, though defense funds are not used to subsidize small firms and the law specifically prohibits any price differential to alleviate economic conditions.

McGuire says that negotiations with small companies are as strict as those with larger concerns, but because of certain items which small business is in a particular position to furnish, it is practical to have competitive bidding for only ten per cent of those contracts. Many small businesses have been established to make a single obscure item that enters into aircraft or weapon manufacture.

Of course, the Defense Department must buy some major items from large firms, says McGuire, but these contractors must agree, as far as possible, to place sub-contracts with small business. If areas with 6 per cent or more unemployment do not get contracts, it is because they cannot meet bids coming from other areas. Every effort is made to interest qualified suppliers in those areas. According to McGuire, small business supplies a large percentage of soft goods and easy-to-make items, but a relatively low percentage of aircraft, tanks, trucks or other heavy items.

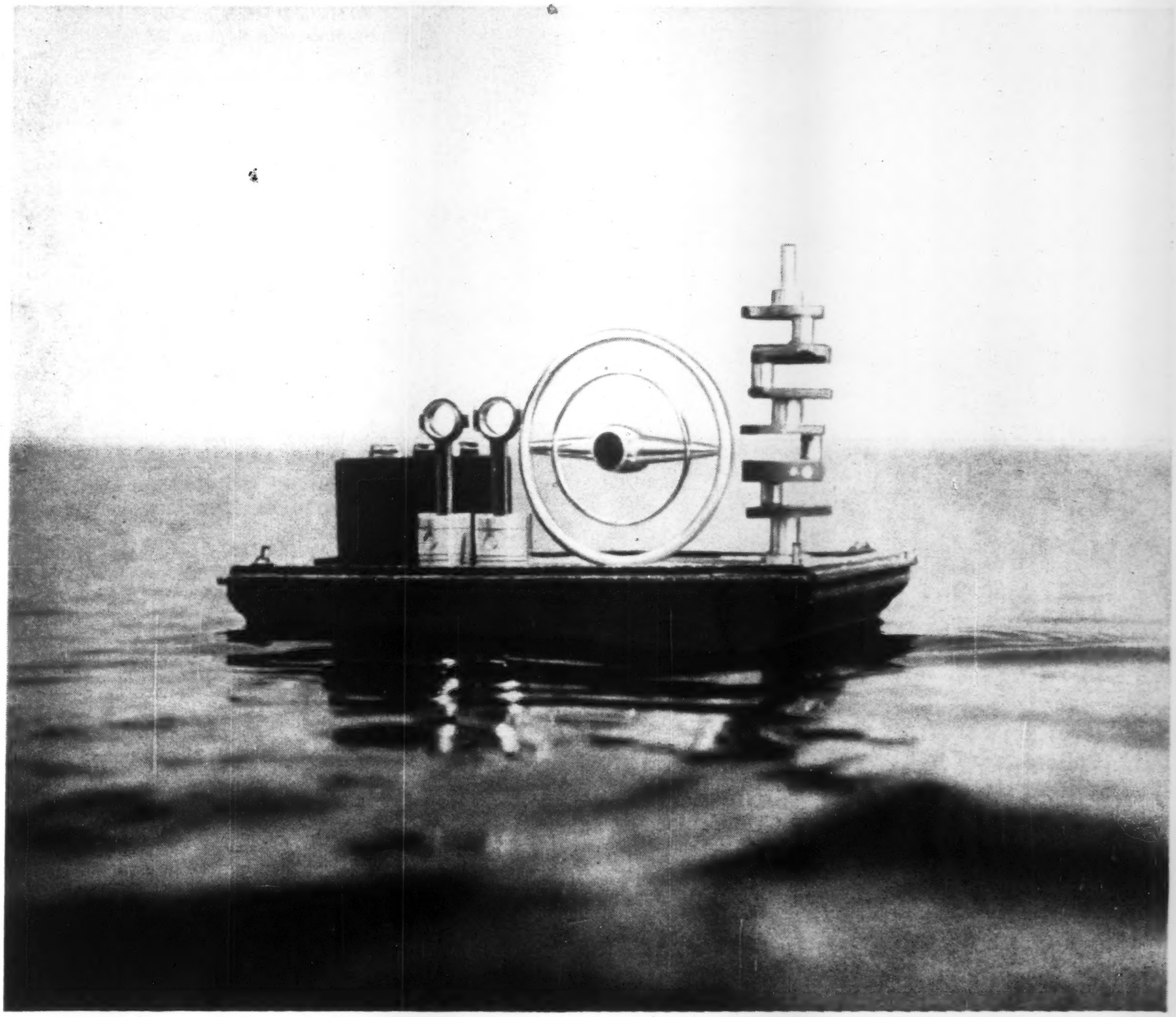
Listing Defense Department plans for the current fiscal year, McGuire says: "The big item of expense is major procurement and operation. In this fiscal year, $16 billion will be spent for such items as aircraft, guided missiles, ships, ammunition, vehicles, and electronics—in other words, 'hard goods.' Construction plans call for the expenditure of $2.2 billion. We are allotting $2.2 billion for spare parts, and $1.8 billion for research and development. Food and clothing for personnel is assigned $1.1 billion. Pay and allowances for personnel accounts for one-third of all defense spending." (Developments in the Middle East may, of course, alter these prospects substantially.)

Patriotism and procurement

The public-spirited way in which private enterprise is helping solve the immediate problems of the vast procurement program impresses Secretary McGuire.

Illustrating the cost of technology, McGuire says: "Modern bombers cost more than their weight in silver. And the cost of missiles is more per pound than the cost of platinum."

Like McElroy, McGuire comes to Government work from business. A stickler for accuracy, with a reputation for fast, incisive decision making, he thinks in terms of money and return on investment—and is, therefore, in a good position to appraise the proposals of the business men with whom he deals. "I hear rumors," says McGuire, "that contractors take unfair advantage of the Government. But in my own experience, I've found a negligible percentage of suppliers who resort to sharp practice." Although he does hear some complaints that Government specifications are needlessly inflexible, he says that in almost all cases those who get contracts do their utmost to cooperate, even beyond contract requirements. Competition with the Communists for weapons superiority is making new demands on the initiative and skill of American industry. "We have no choice but to be strong," says McGuire. END



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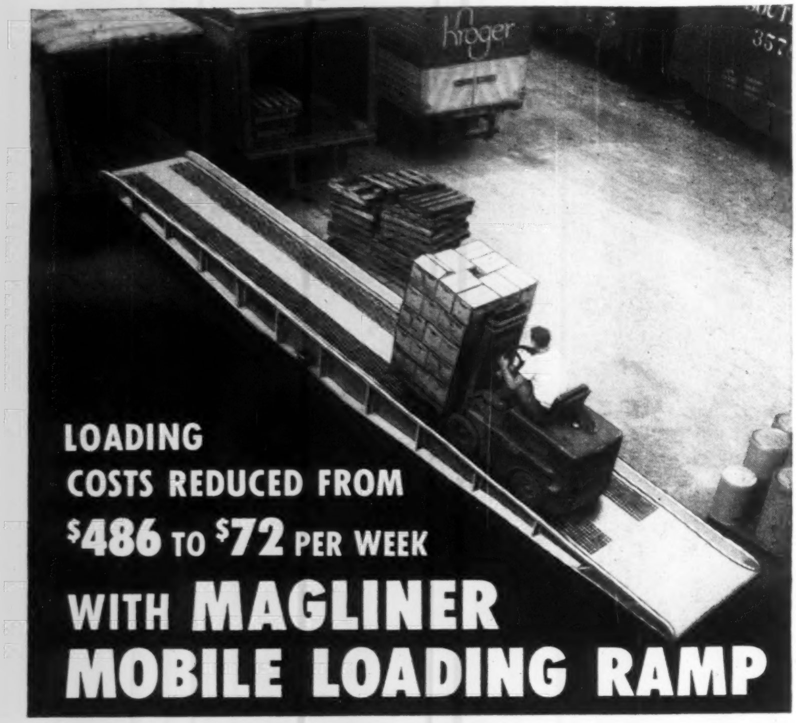

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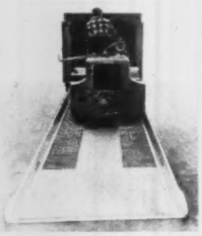

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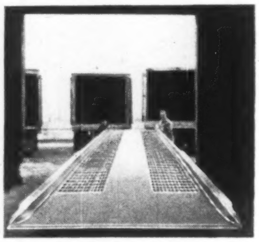

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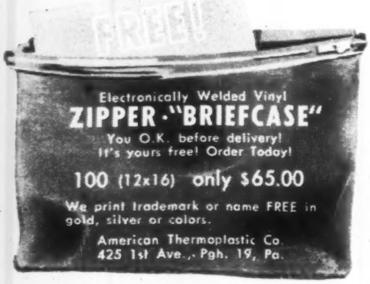

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AUTOMATION, 1958
continued from page 38

zation and approach. The first industrial revolution brought the factory system and the division of labor—new concepts to which the entrepreneur had to adjust. Today, and even more in the future, automation brings changes that are almost as fundamental—the concept of integrated systems and a close marriage between factory and office activities. These new concepts—like those of 200 years ago—require changes in organization, in the nature of decision-making, and in business operations. To be successful in automation, management must meet this challenge. And to preserve the freedoms we value, management must succeed.

Computer users have not been alone in underestimating the problems of automation. Manufacturers have had their problems, too.

In the Underwood Corporation's 1955 annual report, Underwood's then board chairman declared, "We believe electronic devices will add importantly to the profits of the future, and assure your corporation's position in the forefront of electronic data processing." The following year's report, however, reported: "Early in 1956 an important change occurred in our policy concerning electronic computers. It was concluded that continued development and commercialization of large-scale computers entailed greater risks and capital than the company could currently afford, and this work was discontinued."

Such troubles are not limited to the computer field. They have plagued makers of industrial control systems too.

Again, disillusionment among purchasers of automation equipment has not been confined to the office. Consider the following case story:

Late in 1952, a well-known Midwestern automotive supplier began planning a new and highly automated plant that was to prove almost disastrous.

This new facility—in contrast to the data processing operations previously described—was an industrial automation scheme designed for the production of body frames for the 1955 model of a popular low-priced automobile. The heart of the plant was a 39-station riveting and welding transfer line for assembling the frames. Anticipated rate of production was 200 frames an hour, which represented 40 per cent of the customer's total requirements.

A new plant in northern Illinois, specially designed to house the machinery, was scheduled to go into production in the Summer of 1954—allowing a lead-time of eighteen months between preliminary design and full operation. Although the machinery was installed on time, a continuing series of mechanical defects prevented the line from working properly. For example, the lack of complete drawings and proper references from the equipment vendor resulted in misalignment by one-fourth of an inch of a 30-foot station, which, in turn, prevented transfer through the station. Similarly, a number of transfer clamps had to be redesigned because original plans proved inadequate.

Mechanical problems continued to hold up production throughout the Summer of 1954. By Autumn, the body frame manufacturer was forced to install manual machines in order to meet delivery commitments for the beginning of the 1955 model year. This meant hiring 2,500 workers, rather than the originally planned 1,000. Because of local labor shortages, unskilled workers were hired. Although the plant was located in an area which had a history of labor trouble, little weight had been given to this fact when an automated facility was planned. As things turned out, the company was faced with severe jurisdictional disputes and slowdowns.

Another false start

The company succeeded in meeting production schedules with the manual equipment while debugging progressed on the automatic line. The line ran at reduced speed during the Spring and Summer of 1955, but in the Fall the machine began to have frequent breakdowns. Pressure for production prevented, for a time, the shutdown needed for correcting the engineering defects, but the line was finally shut down and rebuilt, with redesigned parts substituted for the ones which were faulty. This work took more than a year to complete. In the Spring of 1957, the line was finally started up again. It ran almost perfectly for four months, turning out superior frames at better than the originally planned rate of production.

The 1957 production year then ended. The 1958 model of the automobile was redesigned on a new frame, which was all welded. The original investment in the automatic line was about $4 million. The estimated cost of retooling for the 1958 frame was about $2 million. In the meantime, because of the frame manufacturer's poor delivery performance, the automobile manufacturer cut his order by about 40 per cent. The economic justification for the automatic line was destroyed. As a result, the 1958 frames have been produced on a semiautomatic line in one of the supplier's original plants. The estimated loss on operation of the automated plant is almost $10 million.

Why should all this have happened? The series of difficulties this manufacturer experienced—unanticipated mechanical trouble, labor trouble, insufficient time for debugging the new equipment, severe pressure for production—might at first glance be put down to

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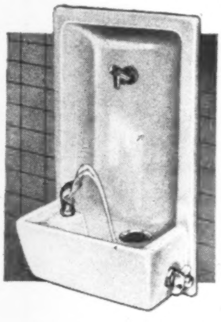

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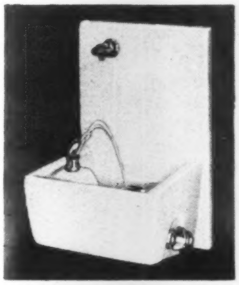

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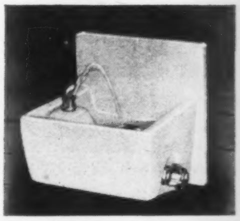

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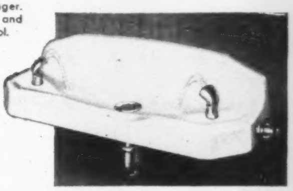

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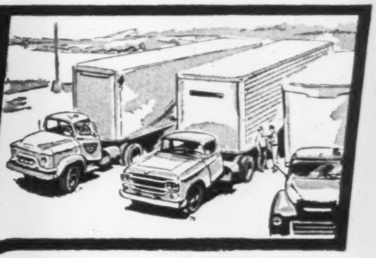

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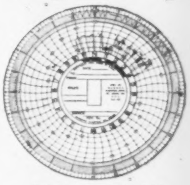

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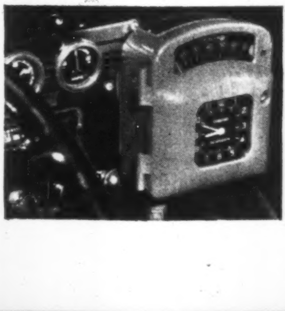

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nothing more than a run of plain bad luck.

But it wasn't bad luck. Every one of the difficulties that made automation a fiasco for this company can be traced to inadequate planning and insufficient lead time. In short, the company grossly underestimated the magnitude of the change it was undertaking.

Needed: new perspectives

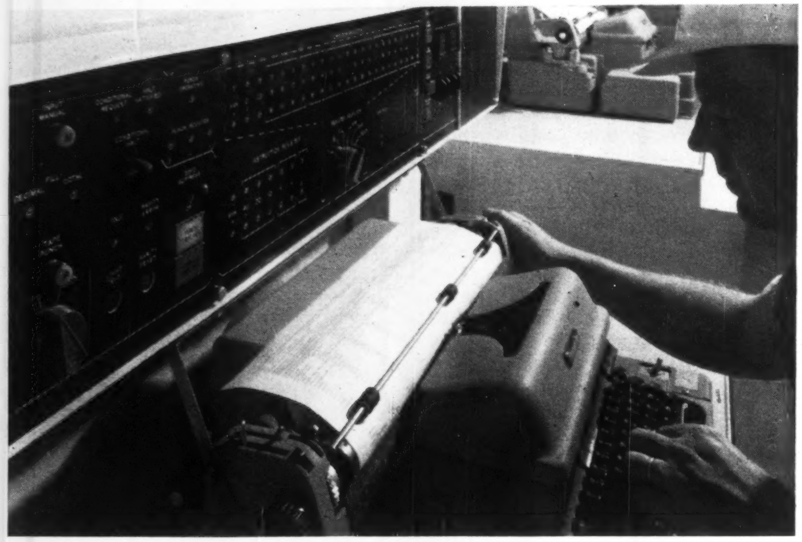
A fresh look at the processes is as basic to a proper application of the machinery and technology of automation as is the installation of the machine itself. Unfortunately, taking a new fresh look and drawing the logical conclusions from what one sees is not so easy as it sounds.

A case in point is that of a West coast aircraft parts manufacturer which bought nearly every piece of equipment produced by its tabulating machine supplier. The company progressed from electro-mechanical calculators to electronic punched-card calculators and finally to an intermediate-size computer. By simply transferring previous routines to the computer without changes in procedure or results sought, conversion to the computer was accomplished very smoothly. The tabulating supervisor in charge of the conversion was basking in praise from all sides for the unusual ease of the changeover.

Finally, however, the controller got a look at a comparative expense statement—which showed that although the computer was apparently not producing any new data, or producing it faster than the previous system, departmental expenses had risen by more than $4,000 per month. After a year of study and some $50,000 in wasted rentals later, additional applications of the equipment provided justification for the higher rental.

Like so many others, this company had, by its very definition of automation, set its sights too low. When such concerns encounter real automation, they find that what they anticipated as just another step is actually a big jump for which, as often as not, they are ill-prepared. Management has repeatedly failed to realize that automation involves basic changes in the way business is organized and staffed, and that success requires the detailed preparation that accompanies any major change.

In the case of the first industrial revolution, it was human organization—the division of labor and the exchange of commodities—that was revolutionized. Power-driven machinery was the tool that made the revolution possible and made it work. In the case of automation, the revolution again involves changes in human organization—this time in the use of integrated machine systems to handle work, rather than dividing it by individual skills.



INCREASED USE OF TRANSISTORS *promises to cut down computer size, permit more specialized applications, possibly reduce costs in future. Here, computer instructions are being typed on the control console of a Daystrom transistorized system installed at the Sterlington Steam Station of the Louisiana Power and Light Company near Monroe, La. After the information has been automatically processed by the system, the "printers" in the background provide a flow of operating data from 350 points around the plant.*

Electronic computers, massive transfer machines, all the glamorous hardware of a new technology—these are only the tools to make it work. That's why it is short-sighted to talk of automation as if it were just another fancy new machine to buy, plug in, and forget.

Labor costs and automation

Probably the most common—and the worst—reason for embarking on an automation program is to save labor costs. Office management in particular has been bedeviled for years by rising clerical costs and the difficulty of hiring enough clerks to get the work done. Mindful of claims to the effect that one man can be taken off the payroll for each $5,000 invested in automatic equipment, management has looked on automation as the answer to a nightmare.

At first glance, this looks like a good enough reason. Ordinarily, an automatic machine does reduce labor costs, though seldom as much as management had hoped. A quick look at the economics of the situation shows why.

A medium-size computer system with tape, tape printer and peripheral equipment costs about $20,000 a month. In addition, the cost of going from the old system to the new can easily reach $275,000. It may cost more if the old system is particularly antiquated. The new system, therefore, has to relieve enough clerks to pay for the equipment and to yield a return on the investment. For a three-year payout on the investment, annual savings above machine costs must be $92,000. To produce this savings, personnel costs have to be reduced $332,000 a year. At $5,000 a year per clerk, this means a net reduction of 66 clerks for the investment to be barely justifiable. And this net reduction has to absorb the extra personnel costs for programmers and machine operators.

Set the sights high

The main trouble with this approach is not that savings usually fail to match expectations. When labor saving is the main goal, it automatically demotes to second place what should be the primary aim of any company installing automation equipment: to exploit fully the potentialities of these machines for doing things that cannot be done very well, or cannot be done at all, without them. Automatic data processing equipment is capable, properly used, of making an entire business run better. If management persists in thinking of automation merely as a method for doing faster tomorrow what is already being done today, it will miss out on the big benefits. These benefits accrue only when management learns to use automation for its unique ability to provide more complete, more accurate, and more timely information about the business.

More information! The thought is enough to frighten any executive whose desk and briefcase are already bulging with information he has not had time to read, let alone digest. But what management has today is not really too much information, but too much of the wrong kind. W. W. Smith of General Electric has compared management reports to "a daily newspaper printed without headlines and without punctuation, without spacing between lines and words, and

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without capital letters. The mental gymnastics required to determine exactly what is going on is too much."

The real payoff

Used properly, automation can turn the art of management into a real science. It can give management better control over an entire business or a large segment of it. It can enable management to plan in advance on the basis not of guesses but of facts. And it can help in decision-making by giving quick, complete answers to problems whose solutions are not complete and often arrive too late to be useful.

One key to successful company strategy in the profit squeeze is better, broader, and more rational planning. The real benefits of computers and automation are not confined to intangibles like better service; they include material, practical results that are measurable in dollars and cents—the same dollars and cents that are used to pay for the computer. But to obtain these benefits requires imagination and a full realization of what is involved in undertaking such a program.

Planning for the automation program in terms of objectives, organization, personnel, training, applications, and day-to-day operations must be imaginative, detailed, and complete. It must be done at the top management level, and it must be done thoroughly enough and early enough to allow for the difficulties and frustrations that are bound to precede the ultimate payoff.

AUTOMATION: The Shape of Things to Come

continued from page 39

tary purposes. In highway engineering, drafting is beginning to be replaced by display of computer output on a TV tube, preserved by photography. The wind screens of experimental jet fighter planes are today made in the form of flat TV tubes, which not only allow the pilot to see through them (as a normal glass pane would), but present him with a graphic display of things he cannot see—radar impulses showing terrain and enemy planes in color. Such display methods will soon be used for presentation of business information to managers. They will be the output of the data processing systems of tomorrow.

3. Special purpose data processing systems will be developed.

To date, computers exist predominantly in the form of general-purpose machines. More important, business men think of computers almost exclusively as general-purpose machines. As data processing technology develops, permitting the use of miniaturization and true "building block" techniques, special-purpose data processing systems will begin to be developed. The *Reader's Digest* uses a special-purpose computer for calculating subscription information for its book club. Similar systems, built to solve problems requiring limited calculation and simple repetitive operations, such as sales analyses or cost accumulations, will be developed. Such equipment is provided with built-in programs, thus cutting down preparatory costs. There is no unused or wasted machine capacity, and such equipment can be made much more reliable than general-purpose systems. Ten years from now these machines will be a part of our everyday business life.

4. Business will employ data processing equipment for tighter control of operations.

While machines must be justified economically by labor savings, experience to date proves that the real payment is not in labor saving, but in tighter control of operations by providing better information faster.

5. "Management by exception" will become a reality.

Selective data concerning operations, and fuller realization of the concept of management by exception, will be important characteristics of tomorrow's data processing. Instead of being used merely to produce vast quantities of data, computers will deliver to management only information on significant deviations from the operating plan—and only when such deviations cannot be corrected by built-in controls.

6. Small shops will use automatic production equipment.

Small shops with short runs of greatly varying products—typical job shops—will find it possible to use automation in the form of numerical or magnetic tape-controlled machine tools (see "The Coming Revolution in Machine Tools," page 46). The bulk of U.S. hard-goods production is in lots of less than 25 identical units, but today's plant automation is largely of the "Detroit" type—large transfer machinery, suitable for only a small portion of our national production. The solution to this problem is on hand in the numerically controlled machine tool. The development of smaller versions of this equipment will be of principal importance to the factory in the future. Such machines will be capable of producing a short run of one product and then, with a change of tape, producing a few more units of an entirely different product, all from the same tool. The next decade will see the spread of this kind of system in the plant, as the last decade has seen the spread of the computer in the office.

7. More information about operations will be available.

A counterpart in the plant to the automatic derivation of information from production processes will be the use of this data for the control of processes. "End point control"—the control of process machinery in terms of production and the quality of the end-product, rather than in terms of a pre-established set of instructions—will become a reality in the next five to ten years.

Today in an oil refinery, for example, a set of production instructions to the operators who regulate the process controls the nature of the end-product. In the future, a set of instruments will sense significant characteristics of both the input and the end-product and will feed back information to the computers controlling the process machinery. This kind of feed-back system will react to changes in the production process faster than operators can, since the computers themselves will "memorize" the instructions, and will regulate the end-product accordingly.

Thus, more reliance will be placed on electronic control systems than on mechanical and pneumatic control systems. This use of information in the plant to control the plant will be of prime importance.

8. Productivity of capital, not labor savings, will be the justification.

Better management control—and not labor-saving techniques—will justify automation in the plant, as it justifies new equipment in the office. When an automatic information system allows a $15 million Fourdrinier paper-making machine to increase speed from 1,800 feet a minute to the mechanically possible 2,500 feet a minute, thus increasing productivity by 40 per cent, the important gain is obviously not a savings in manpower but an increase in efficiency. Studies of oil refineries, normally the most tightly run of automatic plants, show that such systems run on an optimum basis for only a few minutes of the 24-hour operating cycle. Automatic information systems will make it possible to utilize machinery and plant investment for a greater part of the operating cycle than has ever been possible before.

9. New demands will be made on management.

Far from a simple solution to management problems, automation is presenting management with a whole new set of complex and difficult problems to which it must adapt. Bringing in engineers and scientists as managers is not the solution. The development of new concepts of management is essential. Today the competent manager must be able to make right decisions, more often than not, on the basis of *insufficient* data—and see that they are carried out. When presented with *sufficient* data, as tomorrow's management will be, the same set of personality characteristics may not produce the best management. Today we run our businesses, by and large, by the seat of our pants. Seat-of-the-pants management must be replaced by a new business man whose very education requirements are as yet unknown.

Whatever the conditions in tomorrow's business world, the central function of management will, of course, remain the organization, motivation, and control of human effort. But when human effort is freed from the routine tasks of information transmittal, evaluation, and control—as it will be by automation—and applied to more creative intellectual endeavor, even this aspect of the executive job is bound to place new and unforeseen demands on management. The difficult problems of management development and training are crucial to the management problem of automation.

10. Organized labor will try to get into the act.

The 1955 guaranteed annual wage battle provided a glimpse of organized labor's future attitude toward automation. Widely applauded in principle, automation was used as a marching banner and rallying cry when negotiation time came. With the next change of administration in Washington, labor may try to use automation as a justification for a central Government committee on automation.

A committee like this would initially act as a clearing house for information, but this could prove an easy stepping stone to control of investment decisions regarding automation. Three years ago, Governor G. Mennen Williams of Michigan asked for a tripartite Federal "automation commission" composed of representatives of labor, government, and business. This year AFL-CIO spokesmen have begun to say, "We are not afraid of automation; it is the people who control automation who worry us." The trend is clear, and it is not hard to see where it might end. The chances may well be that the proponents of "controlled automation" will eventually win the day.

Organized labor has often raised the question whether or not we are automating too rapidly. It will be raised again and again by citing automation as a threat to job security. But the real question is whether or not we are really automating too slowly for national survival. If we are to increase our living standards and at the same time stay abreast of Russia militarily, we must raise productivity as fast as we can. It is as simple at that. END

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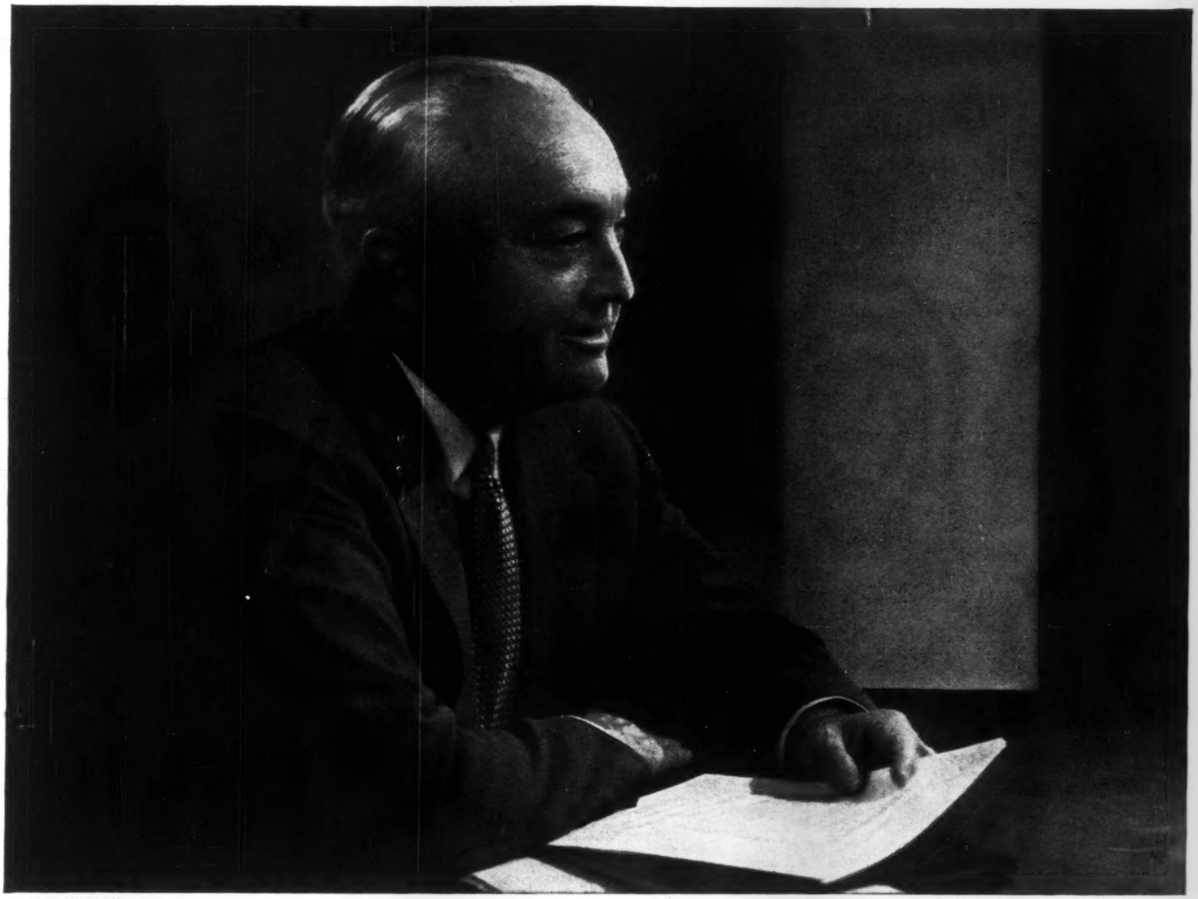**ROY T. HURLEY**

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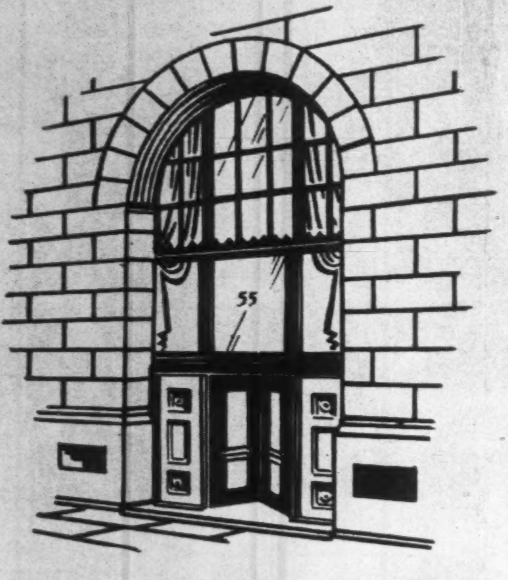

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Watch for Next Month's Extra Emphasis Feature -

THE MODERN OFFICE:

INDUSTRY'S NEW PROFIT FRONTIER

The Reviewing Stand

- Women are moving higher in management responsibility, though not in proportion to their numerical influx into business life generally. There are many notable examples of women in top management, Claire Slote reports in a forthcoming issue of DR&MI, but the lady with the brass hat is still the rare exception. Women are more often to be found at the middle management level because of special skills and interests. Males have no reason to be alarmed by the competition from the distaff side. The lady who gets ahead in business may show a streak of the Amazon or the Lorelei, but talent, energy, and loyalty are the essential elements of her success.

- The old free-wheeling "swindle sheet" is undergoing a protracted program of discipline—first, through a more orderly system of vouchers as required by Internal Revenue regulations, and secondly because the sales lull invites sharp scrutiny of all expense items, including travel and entertainment. As a result of investigations by interview and survey, Art Zuckerman (who reported on "America's Shopping-Center Revolution" in the May issue of DR&MI) will have some pertinent observations on executive expenses and current expense-account policies.

- What are the lessons of adversity, as advertised by one W. Shakespeare, an occasional producer of plays in London, and random student of tragic and comic circumstances in life? Two articles coming up in DR&MI deal with the opportunities as well as the difficulties of preparing for a business upturn when the machinery is idling.

One of these will describe the positive action taken by several companies in launching new products and gearing up the organization for better management in production and sales.

Another article will report what some other companies are doing to avoid the damage to productive efficiency that occurs when a skilled work force is allowed to disintegrate during a period of sluggish sales. Buying a machine for improved productivity is a simple matter compared to the complexities of building one when the parts are human rather than mechanical. —A.M.S.

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